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The OIL WEEKLY and The COMPOSITE CATALOG
for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

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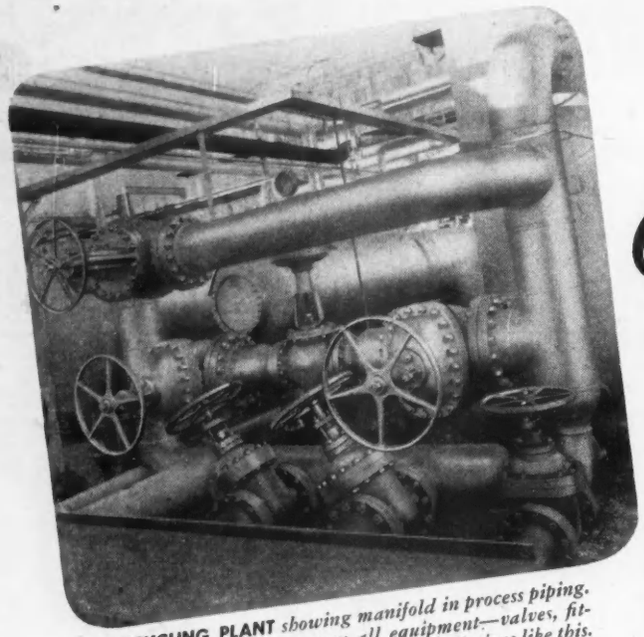

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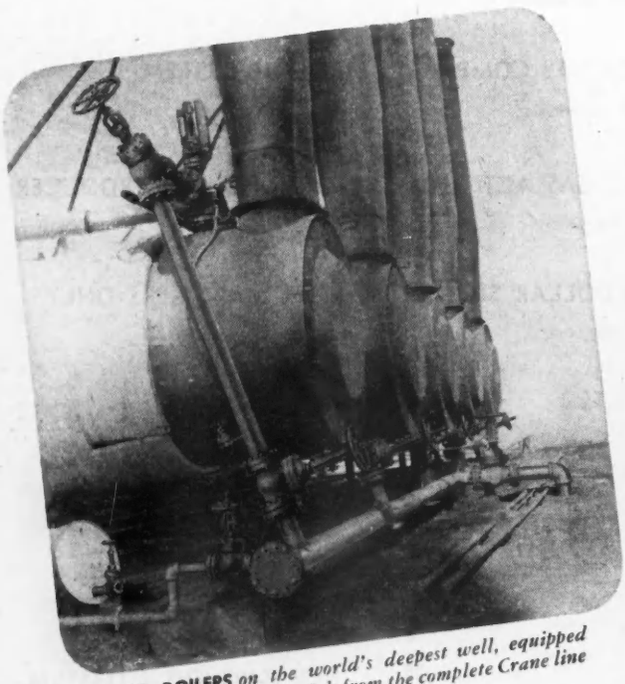

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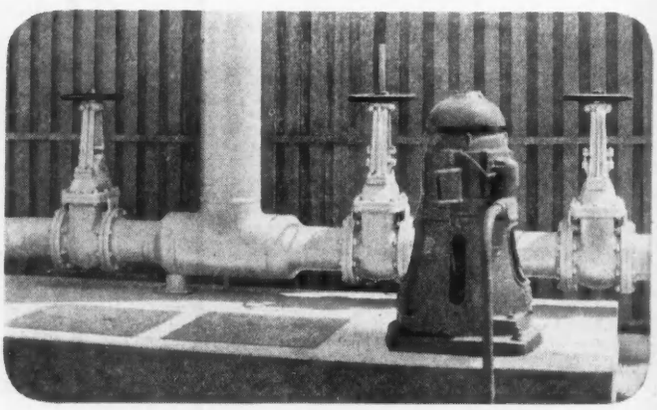

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"Follow The Leader" Prices Now Approved

ALTHOUGH the Department of Justice has attacked the "follow the leader" custom by which price changes initiated by one major oil company quickly are adopted by its competitors, Attorney General Tom C. Clark last week tacitly invited industry generally to follow just that practice.

Clark pointed out that under the Madison case decision price-fixing arrangements among competitors are "normally" subject to condemnation, but declared that the anti-trust laws do not interfere with voluntary price reductions.

While Clark maintained he knew of no industry in which there was any need for competitors to get together in a combination to reduce prices, he said if any such case should arise the department immediately would give it special study.

"In the usual case," his statement said, "a businessman who is able to cut his prices, and who feels that he will obtain an affirmative advantage from so doing, can and should go ahead without making any prior arrangements with his competitors. That is the essence of competition and free enterprise."

The pricing practice which prevails in the oil industry was the subject of one of the allegations in the "Mother Hubbard" suit and is currently under study as a result of last month's price increases.

Since the administration is seeking a lower price level generally, officials hope that initiators of such a move would be followed immediately by their competitors, the very thing of which it complained in the "Mother Hubbard" suit. In some industries, financially weak companies likely would be squeezed out by such action, but the department's statement made no reference to such possibilities.

Professor Erich W. Zimmermann, of the University of Texas, speaks of iron deposits, coal veins, underground oil, etc., as "neutral stuff." He says that they become "natural resources" only after human effort and skill have been applied.

—R. T. HASLAM, Vice President, Standard Oil Company (New Jersey)

* * *

Secondary Recovery Forum Worthwhile

THE Secondary Recovery Forum, planned jointly by the Interstate Oil Compact Commission and the Department of the Interior, and scheduled to be held in Washington May 15, deserves and doubtless will get the interest and attention of the entire oil industry. As THE OIL WEEKLY announced last week, invitations have gone to some 100 committees and organizations, to the Bureau of Mines, state regulatory bodies, engineering and operating committees and individuals. It will be open to any others interested, too. So the meeting should be well attended and the discussion lively.

Separate groups in the industry have been plugging at the question of secondary recovery for a score of years, and this Washington meeting, projected on a nation-wide basis, is proof of the growing importance of the problem.

The Compact Commission and the Oil and Gas Division have announced that the secondary recovery effort needs to be "integrated and coordinated in the interest of achieving the maximum overall result and the greatest possible contribution to national security" and their preliminary plans indicate that they should achieve nothing less.

The nation's recoverable reserves can be increased by one-sixth or some 3.7 billion barrels by secondary recovery methods. That goal is worth the best efforts of not only the government but of the oil industry itself.

How Free Enterprise Aids Research Effort

THE present important position of the petroleum industry has been attributed by Robert P. Russell, president of Standard Oil Development Company, to the whole-hearted application of engineering principles and organized research to oil finding, production, refining, etc.

This organized research, he pointed out, "in the last two decades has revolutionized the processing of petroleum to produce the principal oil products—liquid fuels and lubricants.

"In addition to this technological revolution, during recent years oil research scientists have discovered methods for obtaining from petroleum a large range and variety of new products, or of products which previously were derived from other raw materials. Synthetic rubber, many new kinds of alcohols, fertilizers, solvents, insecticides, waxes and numerous chemicals might be mentioned."

So completely has the petroleum industry turned to research for guidance, Russell said, that today it is a leading employer of technically trained personnel.

Two particularly important developments cited are fluid catalytic cracking and hydrocarbon synthesis—both the results of research in petroleum refining.

Needed for continuation of this work which apparently deals most successfully with a people's problems are "a free, truly competitive system and a political climate in which we can meet in friendship and exchange ideas," Russell concluded.

* * *

The importance of the API program for standardization of oil field equipment can hardly be overestimated. More than 90 percent of such equipment, wherever manufactured, conforms to API specifications, at an estimated saving of $15 million yearly. The Institute pioneered in the field of standardization.

THE WEEK'S NEWS

INDUSTRY representatives and state officials told a Congressional committee they had no confidence in Federal Power Commission restrictions on its own authority and demanded quick action on legislation amending the Natural Gas Act. Rail and coal interests had their inning at the end of the week. Page 29.

Co-op Tax Problem—A flood of letters for and against cooperatives' tax exemptions may influence the House Ways and Means Committee to study the question this spring, but investigation is more likely to go over until next year. Page 32.

Neutrality and Oil Exports—Revision of the neutrality laws so as to prevent the United States from supplying any foreign country with arms or material with which to launch another Pearl Harbor attack upon us has been asked by President Truman in a message which, inferentially, would permit the halting of oil exports to a possible aggressor.

Asks Full Appropriation—National Petroleum Council has asked the House Appropriations Committee not to trim the $463,000 needed by the Oil and Gas Division for the coming fiscal year. Page 30.

Supply Problems Before NPC—Omens of shortages, particularly of residual supplies, will be discussed by NPC at its quarterly meeting in Washington this week. Materials shortages also to be considered. Story below.

Texas Allowable—At a short statewide hearing in San Antonio the Texas Railroad Commission increased the allowable for May 48,000 barrels over the April figure. Page 31.

Week in Washington—Washington will be an important oil center this week, with a series of industry meetings scheduled. Calendar below.

Asks SEC Changes—Legislation relaxing SEC restrictions to make easier the raising of risk capital for speculative ventures has been introduced in Congress by Senator McCarran of Nevada. Page 32.

Refineries on Installment—Anxious to dispose of surplus refinery facilities, the War Assets Administration is selling on the installment plan, without down payment, where purchasers will spend money on the improvement of plants for peacetime production.

Price Change Plan Ok'd—Attorney General Tom Clark finds no objection to the "follow the leader" plan of making price changes—attacked when practiced in the oil industry—to bring about the price recession sought by the administration. Page 27.

Tidelands Decision—Failure of the Supreme Court to hand down an opinion in the tidelands case after one month for consideration leads to speculation that the court may be badly split on the issue of who owns California's valuable underwater oil resources. Page 31.

Washington to Attract Oil Groups This Week

Washington's oil meeting schedule this week includes:

Monday—Public Relations Committee of API to discuss progress of program to date, prepare report to directorate.

Tuesday—NPC quarterly session. May reconstitute its Materials Committee in order to study areas of shortage, particularly pipe. Statistics committee may report. Ditto group making technical evaluation of domestic refinery capacity for production of military aviation fuels.

Wednesday—API directors meet.

Wednesday-Thursday—National Council of Petroleum Associations (chiefly jobbers and retailers) to meet, probably will hear about government's trust-busting effort and congressional small business probe.

Rocky Mountain District API Production Revived

American Petroleum Institute's reactivated Rocky Mountain district, Division of Production, has scheduled a meeting at the Mammoth Hotel, Yellowstone National Park, June 25, a day prior to the quarterly meeting of the Rocky Mountain Oil & Gas Association.

The contiguous meetings were arranged to avoid duplication of travel in the far distances encountered in the Rocky Mountain area. They will be conducted as separate meetings with entirely different programs.

Paul Stock, Yale Petroleum Co., Cody, Wyo., is vice chairman of the General Production Committee for the district and R. B. Curran, Carter Oil Co., Billings, Mont., is district chairman.

Problem of Supply and Materials Shortages Before Council Meeting

The problem of supply is expected to occupy most of the time of the National Petroleum Council at its quarterly session this week, with probabilities that two or more committees may be set up to study various phases of the subject.

Navy Department representatives are expected to touch off the discussion with a disclosure that residual supplies show indications of a gradual tightening up in coming months and a request that the council and OGD attempt to work out some method for increasing supplies. This Middle East situation, it is understood, does not enter into Navy figuring, and the problem is one of supply for operations in waters closer to home.

OGD officials have been concerned for some time over the omens of shortage which already have appeared. A congressional subcommittee recently traveled to the Midwest to receive complaints from tank-wagon dealers and others of shortages, and while they receive fewer than had been anticipated there were enough, it is said, to show that the heating oil situation was serious in some areas toward the close of the winter.

It is believed that similar local shortages will develop in gasoline this summer, but the big thing ahead is a possible serious shortage of both residual distillate oils next winter, the former already foreseen by the Navy. Officials pointed out that the latest long-range forecast of the Bureau of Mines (THE OIL WEEKLY, April 14) showed definitely the possibilities of such shortages.

The NPC survey of the situation is expected to go into the various factors entering into the picture, particularly the materials situation and including crude supply and refinery capacity. Difficulties of the pipe situation, it was said, have contributed to a limitation on new discoveries and developments. This question has been under study by an OGD interdepartmental committee, but so far no agency in the government or industry has come forward with any remedy.

World's Deepest Well Crew Fish for 300 Feet of Pipe

Crews at Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, 5 miles north of Fort Cobb, Caddo County, Oklahoma, have successfully recovered all but 300 feet of drill pipe and are fishing for the remainder.

Total depth of the well the world's deepest is 17,236 feet. About 1200 feet of the 1500 feet of drill pipe stuck in the hole has been recovered in little more than a week. Pipe was cut 1500 feet off bottom after efforts to free it had failed.

Osage Change Asked

Legislation which would permit the Osage tribal council to determine the bonus value of any tract on the Osage Mineral Reservation offered for lease for oil or gas in areas not yet under lease has been introduced in Congress.

Natural Gas Amendments Act Favored And Opposed Before House Committee

Representatives of the gas and oil industries and officials of the producing states took the Federal Power Commission apart last week to show the House Interstate and Foreign Commerce Committee why revision of the Natural Gas Act to define the limits of its authority more clearly is essential.

The testimony of more than a score of industry men and officials developed clearly a lack of confidence in the FPC and a suspicion that to leave the limitation of authority in its hands might mean that reform was only temporary and the same issues which precipitated the present controversy might be revived at some future time.

The point on which witnesses supporting the Rizley bill based their whole presentation was briefed out for the committee by Major B. A. Hardey, president of the Independent Petroleum Association of America.

"The great issue which is tendered to this committee," Hardey said, "involves the question of whether the Congress shall define FPC powers and jurisdiction with precision, or whether the commission shall be left free to determine its own jurisdiction from time to time as it sees fit."

The committee also was told that unless the situation is clarified the conservation efforts of the states with respect to natural gas will get nowhere, because oil operators cannot afford to subject themselves to FPC control.

Producers Not Attracted

This was brought out by John H. Murrell of DeGolyer and McNaughton, who explained that producers make far more on their own than the 6½ percent allowed by the commission and will not subject themselves to that low return by selling their gas because they need the higher profit to offset the cost of drilling maybe nine dry holes before they get a producer. Further, he said, the return allowed by the FPC is based on the cost of producing properties with no consideration for failures.

Some serious charges were leveled against the FPC and some of the interests working for restriction of the natural gas industry.

Hardey for instance, referred to FPC suggestions for classification of uses under the general headings of "superior" and "inferior" and, he said, "the assertion of such power is so far reaching in its implications that the oil and gas industry finds it difficult to believe that nationalization of U. S. energy resources is not the hope and objective of those who put forward such theories. Certainly, an agency that can dictate who can use natural gas and for what purpose it can be used can also dictate what other fuels the consuming public must use and when and for what purposes they may be used."

Murrell declared that controls on end use and production were the big handicaps to the gas industry's expansion and charged that, as in the case of oil years ago, rumors of scarcity and the argument that we will run out of gas are being used to further the idea such controls are necessary.

Price and Markets

Given a field price of 9 or 10 cents a 1000 feet, he said, and all the gas that can economically be conserved will be marketed. And, he added, the supply of gas is, for practical considerations, unlimited because of the tremendous supply of coal from which it can be produced when natural gas resources, estimated conservatively at 151 trillion cubic feet but believed more likely to be in the neighborhood of 200 trillion, are exhausted.

Other witnesses emphasized that unless the FPC's field is rigidly defined controversy is bound to arise between the federal agency and the state conservation bodies.

"Regulation by the FPC of production and gathering and the price of natural gas when sold by the producer or gatherer will lead inevitably to full federal control of oil and gas production, including conservation regulations, and either ousts the states from this function or sets up a dual system of regulation with all the uncertainty, doubt, expense and bureaucratic harrassment that this would involve," it was testified by Hines Baker, executive vice president of Humble Oil & Refining Company.

As did other industry representatives, Baker insisted that present FPC policies were acting as a brake upon exploration for new reserves because, he said, "the policy of preventing natural gas from carrying its part of the cost of exploration, drilling and production increases the burden upon oil production, lessens the incentive for exploration, wildcatting and drilling, and thereby tends to slow down operations, waste present available gas, and dry up the sources of future gas to the injury of the American consuming public and the national interest."

State officials were equally vehement in their denunciation of federal control over production and field prices. They told the committee that federal regulation should begin when the gas enters the interstate transmission line and end when it is delivered to local distributing companies.

Texas Railroad Commission Chairman Ernest O. Thompson urged the committee to press for reform of the act as an aid to the states in their conservation efforts. The major problem in Texas, he said, is to eliminate the waste of casinghead gas under the handicap imposed because of the uncertainty caused by the FPC's attitude.

"State governments which regulate the production of oil and gas are threatened with invasion of their zone of authority by the FPC," Thompson charged. "The threat has produced doubt and uncertainty. We cannot afford the interference with the supply of oil and gas and with the conservation program that would result from the attempt to seize authority for the federal agency . . . . If the FPC should gain control of flare gas—the gas produced in conjunction with oil—as they threaten to try to do, they would also be taking control of the production of oil."

Prefers State Regulation

Thompson submitted a letter from Governor Beauford H. Jester, urging that control over conservation, production and gathering and local distribution activities be left to the state and that the federal authority be confined to the interstate movement and sale of gas. Similar views were presented personally by Governor Frank Carlson of Kansas and in letters from Governors Simeon Willis of Kentucky and Clarence W. Meadows of West Virginia.

No Legislative Restrictions

Meadows pointed out that his state is a producer of gas and also a large producer of coal, but expressed the belief that "there should be competition between the coal and gas industries and that neither should be impaired by legislative restrictions."

Royalty owners also opposed FPC's pretensions to further authority than specifically granted in the statute, R. C. Kay, chairman of the gas committee of

Oil Trade Calls for Tankers

Demand for tankers is building up steadily and the Maritime Commission may withdraw a considerable number of vessels from its laid-up fleets before midsummer to meet the need for additional transportation facilities in the Middle East and elsewhere.

Close to 300 surplus tankers may be in operation shortly under general agency agreements, a considerable number of them engaged in Middle East transportation. At present, something over 225 vessels are in operation.

Original plans of the commission called for the re-fitting this spring of 25 surplus oil carriers, but the number may be doubled or better to meet the requests of both domestic and foreign operators, the former needing tankers for coastwise trade.

A considerable number of tankers has been sold by the commission, its records up to the end of February showing that domestic operators have acquired 57 and foreign operators 59.

the Panhandle Producers and Royalty Owners Association, testified.

Calling attention to the fact that the commission had fixed the value of gas on a classification of well owners, Kay declared that the gas has the same commodity value regardless of who produces it and said "we want no federal bureau to come in and say that any producer can receive nothing from his lease because he has earned its pre-discovery cost. Eventually our one-eighth royalty would be one-eighth of nothing."

Large volumes of gas are being withheld from the market because of the uncertainty created by the commission's policies, it was testified by Maston Nixon, vice president of Southern Minerals Corporation, Corpus Christi, Texas, who said his company has eight gas wells in the Richard King Field closed in "because we are afraid to produce and sell the gas to another company for movement in interstate commerce."

Pipe Line Views

Presenting the position of the pipe line companies subject to the act, E. Buddrus, president of Panhandle Eastern Pipeline Company, declared the changes which are sought will merely allow the natural gas industry "to grow and expand in a normal, healthy, competitive manner."

"We are, in effect, asking that a fair and reasonable price (in the field) be allowed for all the gas entering our pipe lines. I believe that the added cost of gas as a commodity will be insignificant in its effect on the ultimate consumer."

Buddrus attributed much of the present shortage of gas in certain consuming areas to the long drawn-out procedure which must be followed to obtain authority for construction of additional facilities, and contended the situation cannot be remedied until the commission simplifies its methods.

He admitted that these shortages are due in part to the lack of large-diameter steel pipe, but pointed out that orders for pipe cannot be placed until a project has been approved and because of delays in the commission competing consumers of pipe in the oil and other industries are able to get their orders in first and the gas companies must take a deferred position on delivery.

Dr. W. K. Lewis, dean of chemical engineering at Massachusetts Institute of Technology, suggested that thought be given to atomic energy which, he said, may develop so quickly that instead of experiencing a shortage of natural gas the country may never use all the reserves it now has.

Lewis predicted that atomic energy for ship propulsion will be developed within ten years and for general industrial use within 50 years. Even if the latter is deferred, however, he said, there need be no fears of a gas shortage, because of the tremendous reserves of coal from which is can be produced.

Railroad and coal interests and other opponents of the Rizley bill joined in an appeal for substitution of the Dolliver bill (THE OIL WEEKLY, March 24), which, instead of taking the FPC out of the gas business, would vest it with authority to conserve natural gas for utilization "which affords the highest social benefits to the public," give first consideration to its use in municipalities already being served, promote its use in secondary recovery operations for oil, preserve a sound economic balance between reserves of fuel and "mitigate" an adverse effect that the transition and sale of natural gas may have upon other fuel industries. "Our opposition to the increase and expansion of natural gas service is frankly motivated by the desire to prevent dislocations in the industries we represent, with consequent loss of employment and of invested savings, and future higher cost or poorer service to consumers," the committee was told by Tom J. McGrath.

His interests, McGrath testified, favor those provisions of the Rizley bill denying the commission jurisdiction over production and gathering, but object to those sections denying it the power to consider end use in passing upon applications. McGrath emphasized the public interest aspect of conservation which he contended is safeguarded by the Dolliver bill which "merely sets up standards for the guidance and control of the commission" which do not now exist. He also stressed the necessity for the commission to recognize the effect of its actions upon ability to maintain our productive strength in the time of national emergency, arguing that thickly-populated and highly-industrialized areas that have become largely dependent upon pipe lines would be more vulnerable to enemy action than if they were supplied with fuel "from thousands of coal mines throughout vast railroad network in thousands of rail cars. Similarly, he said, natural gas can be used for the production of gasoline and diesel oil to supplement diminishing petroleum reserves.

McGrath defended the proposal to give the FPC authority over end use as being "nothing new," pointing out that gas can be used for the manufacture of carbon black only under permit from the state.

Reserves Position Challenged

Analyzing the reserves position, McGrath challenged statements that the present estimated 150 trillion cubic feet represent a 30-year supply arguing that the rate of increase in production is steadily climbing and will jump significantly when pipe becomes available.

"If this rate of production continues to increase, as it may, by the rates experienced in the past ten years, the equivalent of 150 trillion cubic feet of natural gas will have been produced within the next ten years," he asserted.

All the factors, he told the committee, demonstrate that a sound economic balance between the various energy resources will best serve the public welfare, but the Dolliver bill would not be necessary and would be highly objectionable as an infringement upon the normal practice of a consumer to use a fuel of his own choosing "were it not for the fact that our principal fuel resources are so disproportionate quantitatively.

McGrath charged that the commission has given "scant consideration" to competing interests heretofore, and declared that if the pipe lines were regulated by the Interstate Commerce Commission they would be regulated with a view to

National Council Asks House Group Not to Trim Appropriation for OGD

Appropriation of the full sum sought for support of the Interior Department Oil and Gas Division for the coming fiscal year, $463,900 was urged by the National Petroleum Council in a letter to the House Appropriations Committee last week as that body wound up its consideration of the department's supply bill. The measure is expected to be reported to the House early this week.

In his letter to Chairman John Taber, NPC Chairman Walter S. Hallanan pointed out that the OGD already has saved for the government more than will be required to run the agency for three years, excluding Connally act functions. He referred to its program for the temporary use of the Big Inch lines for natural gas during the coal strike last year, which brought the government more than $1 million in rentals, and to the strong opposition to the WAA's plan to sell the lines only for oil transmission, for which it was offered only $80 million which resulted in their sale for gas for more than $143 million.

The 1947 and 1948 appropriations sought by the office, which include funds for enforcement of the Connally Hot Oil Act "are rock bottom figures" Hallanan declared, "and if reduced to any extent the OGD would be impaired to such a degree as to become worthless and would tentatively mean its abandonment.

"Government is receiving, without cost, essential data and expert advice through its industry advisory organization and principally the NPC along with its committees, which would require the expenditure of large sums to accumulate, if, indeed, it could be obtained at all without such industry cooperation," he reminded Taber. "More economical administration of government affairs relating to oil and gas on the public lands, petroleum materials, export controls, etc., has been achieved through the valuable assistance of the OGD."

Reportedly heavy cuts in Interior appropriations are expected to lead to a bitter fight over the measure on the House floor, spearheaded by Western congressmen opposed to curtailment of reclamation and other activities important in the West.

their competitive effect on other forms of transportation.

"Continuing efficient operation of both the railroad and coal industries is indispensable to national defense and essential to our peacetime economy," he concluded. "We ask no special consideration, but merely seek a reaffirmation of the intent of Congress when it amended the act in 1942.

"In exercising its authority with respect to certificate matters, we believe that the commission should consider our problems, when properly presented to it, and to treat us only in such a manner as we may deserve consistent with the broad public interest."

A warning that pipeline companies invading areas where coal gasification plants "would normally develop" will meet stiff competition within a few years was sounded by Joseph Prusglove, Jr., vice-president of Pittsburg Consolidation Coal Company.

Prusglove said his company, in collaboration with Standard Oil Development Company, plans construction of a demonstration-size pilot plant for perfecting the making of synthesis gas from coal and currently will blue-print a large commercial plant which may be in operation in 1950 or 1951.

The proposed commercial plant, he said, will have a high-heat value gas capacity equal to the maximum of both of the Big Inch lines, or could produce an estimated 14,000 barrels daily of high octane gasoline.

"This coal gasification project holds one of the most promising possibilities of the future development of our national economy," he said.

Supreme Court Presumed Split on Tidelands Case

The Supreme Court last week took its usual two-week recess without rendering an opinion in the tidelands case, on which it had heard final argument a month earlier. No more decisions are due until April 28. The lag is interpreted as meaning that the court again is badly split.

The court denied a petition of the API and others to present oral argument in the Interstate Natural Gas Company case, in which issues are raised of importance to the oil and gas industry with respect to FPC's authority.

Stock Division Shown for Proposed Aramco Purchase

Standard Oil Company (New Jersey) will receive 3500 shares of Arabian American Oil Company stock when pending negotiations are completed for the purchase of a 30 percent interest in Aramco. The 3500 shares of stock will be purchased for $76½ million. Socony-Vacuum Oil Company will get 1166⅔ shares at a cost of $25½ million as its 10 percent interest.

The proposed deal has been temporarily delayed pending final settlement of a lawsuit in London. Arabian American presently is jointly owned by The Texas Company and Standard Oil Company of California.

48,000-Barrel Daily Increase Over April Set for Texas

The Texas Railroad Commission set May allowables at 2,293,000 barrels daily at the monthly statewide proration hearing held in San Antonio last week. This is an increase of 48,000 barrels daily, approximately, over the allowable in effect in April.

Operators attending the hearing requested small increases, nominating 2,512,873 barrels daily 43,040 barrels more than April nominations. The commission granted all changes requested. The largest increase in nominations was in West Texas, District 8, and totalled 41,710 barrels. Humble Oil & Refining Company said that if facilities are available in June it expects to buy 65,000 barrels more from West Texas. For the month of May, however, only 15,000 barrels increase was requested by this company.

Eastern States Petroleum Company asked for 10,000 barrels more from West Texas each day, and there were no more specific requests.

Companies asked for 23 producing days for the East Texas field, one day more than in April, and an increase of 5000 barrels per calendar day. The commission pointed out that East Texas pressures have increased 18.89 pounds in the past 26 months while the field was producing 270,305,682 barrels.

The new order provides for retaining daily allowable schedules used in April, allowing West Texas fields to produce 20 days, the East Texas field 23 days, exempting the Panhandle from shutdowns, and permitting the remainder of the state to produce 27 days. The hearing lasted 30 minutes.

The commission announced that the next statewide hearing will be held in Corpus Christi May 14. An order for June, July and August, is contemplated then, Chairman Ernest Thompson said.

Crude Oil Production in the United States

(Estimates compiled by THE OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED April 19	April 12
Alabama	1,000	1,200
Arkansas	73,700	73,800
California	910,400	909,600
Colorado	36,000	36,750
Florida	550	575
Illinois	186,300	186,100
Indiana	18,500	18,250
Kansas	278,450	269,800
Kentucky	26,900	27,300
Louisiana	408,750	407,610
North Louisiana	95,300	95,000
South Louisiana	313,450	312,610
Michigan	43,500	43,000
Mississippi	86,700	88,750
Missouri	100	100
Montana	23,000	22,000
Nebraska	600	600
New Mexico	103,200	103,650
New York	13,200	13,000
Ohio	9,000	8,850
Oklahoma	376,900	378,900
Pennsylvania	34,800	34,150
Tennessee	25	25
Texas	2,166,150	2,150,550
Tex. R. R. Comm. Districts:		
Dist. 1—South Central	20,750	20,665
Dist. 2—Middle Gulf Coast	158,000	157,960
Dist. 3—Upper Gulf Coast	480,600	483,440
Dist. 4—Lower Gulf-S.W.	241,950	241,970
Dist. 5—East Central	38,000	38,150
Dist. 6—East Texas Field	335,000	325,570
Dist. 6—Rest of North East.	111,500	111,285
Dist. 7-B—North Central	37,000	36,770
Dist. 7-C—West Central	36,350	35,700
Dist. 8—West	485,950	480,710
Dist. 9—North	136,200	133,540
Dist. 10—Panhandle	84,850	84,790
West Virginia	7,750	7,600
Wyoming	112,500	109,500
Total United States	4,917,975	4,891,660

Total stocks, foreign and domestic, April 12, as reported by the Bureau of Mines were 231,546,000 barrels.

Flare Gas Elimination Progress Cited in Texas

Operators reported substantial progress as the Texas Railroad Commission last week continued hearings to show why oil fields should not be closed in unless gas flares are eliminated. Reports included:

North Cowden Field, Ector County—The only gasoline plant utilizes 77 percent of the 32,000 Mcf of casinghead gas produced daily. Cities Service plans to enlarge plant and rework gathering facilities by September, 1947, so all gas can be handled.

Goldsmith Field, Ector County—Phillips operates gasoline plant with daily capacity of 56,000 Mcf. Approximately a tenth of 47,800 Mcf produced daily is flared, but Phillips plans to continue enlargement of facilities so as to be able always to process all production where feasible.

Sour Gas Experiment

McElroy Field, Crane and Upton counties—Phillips-Crane gasoline plant processes approximately 26,000 Mcf. of 36,000 Mcf. casinghead produced daily, with most of residue flared. The gas is sour, has no market. Feasibility of returning residue to the reservoir being studied. Gulf has such an experiment under way.

Slaughter Field, Cochran, Hockley and Terry counties—38,000 Mcf. sour gas produced daily and substantially all flared. Eight producers to construct a gasoline plant with capacity of 90,000 Mcf. Approximately 75 percent of the gas produced is committed and plant should be completed in late 1948. Residue to be sold to El Paso Natural Gas Company.

Old Ocean Field, Brazoria County—Substantial progress made toward elimination of 14,000 Mcf. flared daily. Terms of unitization, which plan is supported by 90 percent of total mineral interest, should be completed within 30 days. Then operators could end flares within 90 days.

KMA Field, Archer and Wichita counties—Of the 49,699 Mcf. produced daily during February, 1947, 48,030 Mcf. was processed by gasoline plants and 10,000 Mcf. of residue and raw gas was flared. United takes gas sold for domestic use. Lone Star to take 4,000 Mcf. now flared at the plants, during summer, more during winter.

Ways and Means Committee May Handle Co-Op Taxation

The House Ways and Means Committee may take the ball away from the new House Small Business Committee for an investigation of the tax advantages enjoyed by cooperatives, but there is no chance of any legislation being enacted on the subject this year.

Republican leaders of the former committee have from time to time discussed the possibilities of hearings on general tax revision this session, at which the cooperative situation would be one of the important subjects, but have been warned that such hearings would be long drawn out and there would not be time before adjournment of Congress for writing a bill.

Tax experts of the Joint Committee on Internal Revenue Taxation have been engaged since last year on a study of cooperative tax exemptions, and a similar study has been under way in the Internal Revenue Bureau. Both surveys have been virtually completed, and the joint committee staff may submit its report within the next few weeks.

No Formal Report

The Small Business Committee, now under the chairmanship of Representative Walter Ploeser of Missouri, also may get into the question of cooperatives from the standpoint of the impact of their competition upon small independent businesses, but likewise is expected to have to defer its investigation until next year. It was from this committee, last year, that then Chairman Wright Patman of Texas issued a report highly favorable to the cooperatives, holding that any tax advantages which they might enjoy were inconsequential, drawing from Ploeser such strong objections that the committee never formally adopted the report.

Members of the Ways and Means Committee disclosed that the question of cooperatives' taxes has been the subject of a flood of communications, both pro and con, and said it had come up several times in executive sessions.

However, it was pointed out, the committee now is engaged in a long hearing on the reciprocal trade agreement program, which is expected to be fruitless so far as any restriction on the State Department's plans for negotiation of an 18-nation agreement is concerned, and, with adjournment tentatively set for mid-July, will have little time in which to consider general tax revision.

Algeria Production

Crude oil production in Algeria during 1946 totaled 1295 barrels, all of which was produced in the Tliouanet field, Oran Department. This field, discovered in 1914, had 12 wells producing on artificial lift at the end of the year. Cumulative production through 1946 was 226,000 barrels.

The Ain-Zeft field, discovered in 1895, was not on production during 1946 after producing 3000 barrels in 1945. Cumulative production for this field is 21,000 barrels.

During the year four oil wells were completed in the Tliouanet field with total footage of 3140 feet. No rigs were running at the end of the year; however, plans have been made for the drilling of three tests during 1947.

THE OIL MAN'S CALENDAR

APRIL 22	National Petroleum Council, Washington, D. C.
23–25	Natural Gasoline Association of America, Annual Convention, Dallas, Baker Hotel.
24–26	Interstate Oil Compact Commission, Quarterly Meet, Birmingham, Ala. Tutwiler Hotel.
30-May 1 & 2	American Gas Association, Natural Gas Division, Spring Meeting, Chicago, Stevens Hotel.
MAY 4– 7	Annual Membership Meeting, Petroleum Equipment Suppliers Association, San Francisco, Mark Hopkins Hotel.
6– 8	Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, Joint Convention, Houston, Rice Hotel.
6– 8	Annual Gas Measurement Short Course, Norman, Oklahoma.
8– 9	Mid-Year Meeting of Directors, Independent Petroleum Association of America, Jackson, Miss.
15	OGD—Oil Compact Commission Stripper Well Conference, Washington, D.C.
15–16	Pacific Coast District, API Division of Production, Spring Meeting, Los Angeles, Biltmore Hotel.
15–17	National Oil Scouts and Landmen's Association Annual Meeting, Roosevelt Hotel, New Orleans.
21–24	ASME Oil and Gas Power Division, Cleveland, Ohio.
22–23	Mid-Continent District, API Division of Production, Spring Meeting, Amarillo, Texas, Herring Hotel.
27–30	Texas A. & I. College, Second Annual Course in Gas Technology. Kingsville.
JUNE 5– 6	Pennsylvania Grade Crude Oil Association Annual Meeting, Pittsburgh, William Penn Hotel.
16–19	ASME Semi-Annual Meet, Chicago, Stevens Hotel.

Nomads Chapter monthly meetings: LOS ANGELES, second Wednesday, Mayfair Hotel. HOUSTON, second Monday, Ye Olde College Inn. NEW YORK, first Monday, Louis Sherry's. TULSA, third Wednesday, Hotel Tulsa. DALLAS, date not yet fixed.

Government Has Surplus Holdings at Stricken Port

Fate of Government plants in Texas City which cost $36 million during the war was unknown to Washington officials in the early days following last Wednesday's explosions which wrecked much of the industrial section of that port and caused heavy loss of life.

That figure was given by War Assets Administration as to the value of plants in the area which it held as surplus.

Among the six plants are the American Liberty 100-octane plant, costing $12.5 million; Republic Oil Refining Company 100-octane plant, $11.7 million; Pan American Refinery unit, $3 million, and a butadiene plant operated by the Southport Petroleum Company of Delaware, $1.5 million.

The Monsanto Chemical Company plant which was destroyed was purchased by that company from the government for more than $9 million. It cost approximately $19 million to build.

East Texas Asks Increased Salt Water Ratio Order

Representatives of East Texas Salt Water Disposal Company recommended to the Texas Railroad Commission last week that the amount of water to be injected for each barrel of "bonus" oil permitted in the East Texas field be increased from 60 to 75 barrels. An order also was proposed which would provide that marginal wells and wells for which the operator is willing to take a marginal allowable that produce 100 barrels or more of salt water should be closed in and their allowables transferred to other leases.

The allowable so transferred would be produced under the commission's decline curve, which the disposal company recommended be altered downward from four to two barrels minimum. Bryan W. Payne, president of the company, estimated that if such an order were put into effect, water production in the field would be reduced some 100,000 barrels daily.

Louisiana Nominations Show Decline for May-June

The demand for crude in Louisiana during May and June will be less than during April, according to nominations filed at the statewide hearing held before the Louisiana Conservation Commission at New Orleans last week. Nominations for May totaled 450,680 barrels of crude daily, and 453,616 barrels daily for June, as compared with April's total of 476,821 barrels.

Drilling Contractors Vote Continuance of Mud Course

Continuation of the association's membership in the National Petroleum Council as well as the continuation for another year of its mud school program were approved by the directorate of the American Association of Oilwell Drilling Contractors meeting recently in Tulsa.

John Woodruff, University of Texas, division of extension training, will continue to coordinate the mud school course. The association and the University split the $15,000 cost.

The directors also stressed the importance of pushing all programs of an educational nature, and dissemination of practical information to members.

William Broadhurst's insurance committee was thanked for excellent work toward making drilling contractors conscious of their insurance requirements.

The board will meet next at Shreveport, La., early in July.

Securities Act Change

Amendment of the Securities Act of 1933 to make easier the raising of risk capital for new ventures in oil, mining and other speculative activities is provided for in legislation introduced in Congress by Senator Pat McCarran of Nevada. The measure would eliminate all of the present Securities and Exchange Commission proceedings.

PIPE LINE NEWS

Hull Sees Encouraging Signs for New Pipe Line

Burt E. Hull, head of Trans-Arabian Pipe Line Company, has returned to the United States following a trip to the Middle East for a preliminary survey of the route of the proposed pipe line from Saudi Arabian fields to the Mediterranean. Accompany Hull was H. H. Hall, head of Standard Oil Company of California's engineering department, who has been with him on the two-month inspection trip.

During their stay in the Middle East they covered the entire route of the 1200-mile, 30-inch carrier by air and by automobile, the first time the entire length of the route has been covered by land. Final decision as to the terminal on the Mediterranean end is yet to be made, and probably will not be announced for several weeks, other than the fact that with the encouraging news of an accord having been reached between the Syrian and the Lebanese governments. Right-of-way now will be available to permit construction of the terminal on the Lebanese coast near, and probably south of Beirut.

Early decision as to terminals and other factors is hoped for by the companies involved, since it is only through completion of this, and similar undertaking, that the full productive capacity of the Middle East fields can be made available to the critical demand centers in Europe and North Africa.

Graves Is Elected Head Of NPC Pipe Line Group

Organization and program discussion engaged the newly appointed committee on Petroleum Pipeline Transportation of the National Petroleum Council at its recent Washington meeting. B. I. Graves, vice president of Tide Water Associated Oil Company, New York, is chairman; W. R. Finney, Standard Oil Company of New Jersey, vice-chairman; and H. F. Parsons, Tide Water Associated Oil Company, secretary.

Factual studies of petroleum pipe line transportation from the standpoint of its adequacy to meet national defense and other emergency needs is programmed.

West Texas Extension Slated

Gulf Refining Company, pipe line division, is assembling pipe and equipment for the construction of 12 miles of 6-inch crude line extension of its West Texas system from the Jordan-Ellenburger field, Ector County, to an important Ellenburger discovery by Gulf Oil Corporation in Northeastern Crane County. Crude from the two Ellenburger areas is of premium quality, and will be segregated by batching in making deliveries to Gulf's Midland terminal.

H. B. Zachry Co., Addicks, Texas, will install the unit, which is scheduled to be in service by the end of April.

Secondary Recovery Stressed by API Production Division, Eastern Unit

Natural gas markets of the East and secondary recovery problems of eastern oil producing states were subjects covered at the spring meeting of the American Petroleum Institute's division of production for the Eastern District held last week in Pittsburgh.

Major B. A. Hardey, president of the Independent Petroleum Association of America, and Franklyn Waltman, Sun Oil Company, were the featured speakers at the general session Thursday morning. Major Hardey discussed a national oil policy and its effect on domestic petroleum industries and Waltman discussed a progressive public relations program for the oil industry.

At the technical session beginning Thursday afternoon William Hanson, senior fellow at the Mellon Institute, Pittsburgh, spoke on "Recent Advances in the Problem of Oil Origin"; and A. P. Clark, South Penn Oil Company, Bradford, spoke on "Connate and Drilling Water Saturation of Baker Cores."

James E. Pew, manager of the natural-gas department, Sun Oil Company, Philadelphia, in a paper entitled "Potential Natural-Gas Market of the East," emphasized that the natural gas industry's chances of further expanding into the great potential eastern market, to replace more expensive and less desirable fuels, depends upon unpredictable attitudes of the Federal Power Commission, "unreasoned opposition from certain political figures in the Southwest," and the availability of materials. Pew's paper presented an analysis of fuel consumption in the East, according to types of use, as well as a comparison of its natural-gas equivalent on a heat-content basis.

Harry M. Ryder, Washington, D. C., engineer, spoke on the "Effects of Increase in Water Pressure on Water-Flood Oil Production." Citing eight field cases, Ryder said that an increase in the pressure of the water used for the water flooding of Bradford field properties resulted not only in increases in the rate of oil production, but also in substantial increases in the quantities of oil ultimately produced or to be produced. An average increase in water pressure of 188 pounds per square inch (13.4 percent) resulted in an increase of 24.2 percent in the ultimate oil production, according to Ryder. He said that the proper choice of pressure is essential to the most effective water flooding, and that the quantity of oil produced depends on the method of operation.

L. D. Schmidt, Synthesis Gas-Production Laboratory, U. S. Bureau of Mines, Morgantown, W. Va., spoke on "Underground Gasification of Coal." He presented data available on the results of Russian experiments, with special emphasis on the three projects that are now in an active state. He also gave his observations of the German process for gasifying oil shale underground by the chamber method. The experiment being conducted by the Bureau of Mines in cooperation with Alabama Power Company at Gorgas was described. From initial data obtained in this experiment, difficulties that must be overcome in developing a commercially successful underground gasification method were discussed.

Other papers presented and available for digest are printed below.

Sixty-Mile Line Removed In Liberty-Jefferson Area

Anderson Brothers Corporation, Houston, is taking up an 8-inch crude line for Sinclair Refining Company running from Smith's Bluff Station, Jefferson County, Texas, to Martha Junction, near the Martha field, in Liberty County. Total mileage of pipe being removed is 60 miles, all of which is threaded type pipe put down in the years following discovery of the Mexia field, Limestone County. Anderson Brothers plan to complete removal of the line by May 15.

Texas Mid-Continent Asks Early Return of Tracts

The Texas Mid-Continent Oil and Gas Association has adopted a resolution recommending enactment of a bill to promote the leasing of such lands as acquired by the federal government during the last few years which are in excess of Public Domain Lands. These lands—some 150 million acres—are under the control of numerous departments and agencies bureaus with varying unauthorized and non-statutory departmental views as to their disposition and return to private ownership.

Early disposition and return to private ownership of these lands was urged by the association in order to promote and encourage the prospecting for oil. The association said it feared that the retention of such lands by the bureaus and agencies "is a subterfuge and pretext to put the United States government into the oil and gas producing and marketing business contrary to the form of our government and the intent of Congress."

Practical Aspects of Drilling the Clinton Sands of Ohio

By JAMES F. SWAIN, Huntley and Huntley, Pittsburgh.

The Clinton sands of Eastern Ohio, an important source of natural gas in the past, now are producing a substantial quantity of this fuel and constitute an important undrilled reserve. The present explored area from Lake Erie southward through Lawrence County is the current scene of much drilling activity and is probably the most active area of operations in the Appalachian area today. Current operations are expanding the known limits of productive territory

eastward with the limits on this side not yet defined.

Sand conditions cause erratic production relationships. The Clinton sand is said not to be a blanket sand but is a progressive step-like arrangement of strand-line sand positions, each one slightly younger in age and each one definitely a separate and individual sand deposit. With sand conditions in this light, it is understood how dry holes are encountered between producing wells and producing wells between dry holes.

The practical aspects of production have to do with drilling with cable tools where cave-ins and water encroachment are encountered. These problems have been solved by setting casing to appropriate depths.

Design of Long Distance Natural Gas Transmission Lines

By R. G. STRONG and T. H. BEALS, Natural Gas Pipeline Company of America, Chicago.

Before a new gas pipe line system can be intelligently designed it is necessary to fix its origin and terminus, to have knowledge of the market requirements of the area to be served, and to be assured of an adequate supply of gas.

In addition to determining the size of pipe to be used and the number and size of compressor stations, the engineer must also take into consideration the geography of the country between the source of supply and point of consumption, and the character and corrosivity of the soil, the latter so that the line can be adequately protected by coating and wrapping. A decision with regard to final delivery pressure is necessary, as this influences the location of the compressor station nearest to the market and of the line and likewise the pressure of the gas in the field must be known in order that the first compressor station can be properly located.

The most economical combination of pipe and power is generally determined by the "cut and try" method. Knowing the volume to be handled, the field pressure, the pressure required at the market end of the line, and the size of pipe commercially available, calculations can be made using various sizes of line, compression ratios and station spacings until the best combination is found. This paper does this for a hypothetical 1000 mile pipe line using 24-inch, 26-inch, 28-inch and 30-inch pipe and 1250 horsepower horizontal compressors to bring the results at least fairly well in line with present practice for actual projects.

Rotary Tool Drilling in Ohio

By NOAH ANDREWS, Union Drilling and Producing Company, Mt. Pleasant, Mich.

One of the rotary drilling units being operated in the Canton, Ohio, gas area is described. Time required to move in one of the rotary units to an average location and to assemble the equipment for start of actual drilling operations is given as 48 hours. Wages for the four-man crews (each crew working eight hours) in the Canton area is $13 per day for the driller, $9.50 for the derrick man and $9 each for the two roughnecks. Average bit cost for drilling a 4700-foot well in Canton is $3000 and the average time required to drill a rotary hole is 40 days.

To drill a rotary hole in Canton, the producer eliminates 1300 feet of 8⅝-inch casing and 3300 feet of 7-inch casing, or a saving of $4000 on casing that would be required in a cable tool-drilled well. Rotary drilled wells are completed from 20 to 40 days sooner than cable tool wells.

In order for rotary contractors to operate profitably in the Canton area, it is the author's opinion that they must get $4.25 per foot drilled. Until such a time as this price is forthcoming, the author says that cable tool contractors need have no concern about rotaries in Ohio.

Water Flooding Research Is Essential

By DAVID SCOTT, JR., Ryder Scott Company, Bradford, Pa.

Water flooding in the Bradford field started in 1924 and by the early 1930's producers were convinced that the problems of water flooding were so complex that a vast amount of additional research work was needed. A contract with Pennsylvania State College was signed in 1933 and this research eventually carried on not only by the college but by trade associations and individual companies as well, has resulted in important strides in secondary recovery. Findings include:

1) To produce the maximum amount of oil it is essential properly to complete the wells, shooting each layer which can supply recoverable oil.

2) From sufficient core information, obtained from drilling the intake wells first, the best location of the producing well can be determined.

3) Water engineers or water chemists must work side by side with reservoir engineers. Water engineers say that the type of water used in flooding has a great deal to do with the quantity of water that may be forced into the reservoir.

4) The knowledge gained relative to reservoir characteristics, and the best kind of water has brought about redevelopment of abandoned properties.

We can never know too much about the physical and chemical characteristics of the oil reservoir. We need to know more about the sand body, of how the oil and connate water lie in the sand, how the water mixes in the sand pores with the oil and connate water, what kind of water is best for flooding certain types of sand. And above all, we must determine how leases differ from each other.

Close cooperation is essential between the research worker in the laboratory and the operator in the field.

Some Economic Factors Affecting the Natural Gas Supply in the Appalachian Region

By ALDEN W. FOSTER, Petroleum Engineer, Pittsburgh.

During the past ten years the producer of gas in the Appalachian region has seen the demand for his product increase at a time when it was difficult to maintain, let alone increase, his ouput. Usually this should be a favorable condition pricewise, as evidenced by the prices of oil and coal. Operating as a part of a controlled economic system, however, he received no benefit from this condition.

At the same time rising costs of development, operation, wildcatting and taxes narrowed his margin of profit.

With the demand for gas increasing, a drilling campaign of large magnitude must be undertaken to uncover new reserves in the area, and substantial additional storage must be provided.

When the time comes to prospect for deep gas in the hazardous Clinton sand areas of Eastern Ohio, West Virginia and Pennsylvania, will the hopes for financial reward tempt the investor who now sees his properties depleted at small return to him? In Eastern Kentucky an important producing company has substantially curtailed its development program although it still has large undeveloped proven acreage of a sub-marginal class.

The regulatory bodies might well have taken a long range view and permitted an increase in rates as commodities advanced. If the field price of gas were allowed to increase, the producer would then branch out and seek deeper production in the Clinton and Oriskany sand, thus preserving the customer's position by providing adequate delivery capacity and future reserves.

Recent Advances in Selective Exclusion of Water in Input Wells

By DON MARTIN, Hercules Powder Company, Wilmington, Dela.; KURT H. ANDRESEN, South Penn Oil Company, Bradford, Pa.; and F. W. ELLENBERGER, Kendall Refining Company, Bradford, Pa.

For years the search has been on for a method to exclude water selectively from sand strata which have been exhausted under the effect of water-flooding operations. Of the many experiments, the most promising materials applied have been solids dispersed in water.

Laboratory research facilitated development of an emulsion suitable for selective exclusion of water from certain parts of the sand body in input wells. Emulsions are a desirable agent because of the great simplicity of application and the possibility of their selective introduction into those sand stratas which possess the highest relative permeability to water. Described is a material found to be superior to others, because of the complete insolubility of this material in petroleum hydrocarbons, its solubility in dilute alkali solution, its great hardness, and its comparative low cost.

Field experiments proved that the average particle size of the emulsified material must be less than one micron for highest efficiency. A method to determine selectivity on input wells has been developed by recording changes in pressure fall-off curves after the water injection is suddenly discontinued. The results have produced favorable effects on all intake wells, where selective exclusion of water from certain sand layers was attempted. Good selectivity of the process has been found, wherever production records are available. Two field tests demonstrate satisfactorily that the effect on the production behavior has been very favorable. Extremely high pressures against the solid particles, or the use of flood water with high pH values do not destroy results obtained by the plugging action of the emulsion.

Five Companies Join in Extensive Magnetometer Survey of the Bahamas

An aerial magnetometer survey will be made of the vast area off the southeast coast of Florida which comprises the Bahamas group of islands. The work will be undertaken by almost the entire group of oil companies which have for several years been acquiring marine prospecting and exploitation licenses in the Bahamas.

Companies in this project are Anglo-Bahamian Petroleum Company, Ltd., (subsidiary of Anglo-Iranian Oil Company); Bahamas Exploration Company, Ltd. (Gulf Oil Corporation); Bahamas Oil Company, Ltd. (Superior Oil Company); Shell Company of Bahamas, Ltd.; Standard Oil Company (Bahamas) Ltd., an affiliate of the Standard Oil Company (New Jersey).

The Aero Service Corporation which has been active, with government cooperation, in the wartime development of the air-borne magnetometer, will carry out the operations starting perhaps this week. It is estimated that the area of 50,000 to 80,000 square miles included can be worked in eight months, the cost to be in the neighborhood of $750,000.

Aero Service's Douglas DC-3 plane has been especially modified to accommodate a magnetometer which was developed by the Gulf Research and Development Company, and the necessary instruments for accurate control of flights. Flight-control equipment calls for continuously radio-controlled high precision flight paths and use of Radio Corporation of America's "Shoran" developed for the Army Air Forces during the war. Shoran stations have been installed on three boats to be used in conjunction with another permanent station installed on New Providence Island. The boats, anchored in known positions, will serve as permanent datum points. The boats are air-sea rescue type boats obtained from government surplus and will be operated by Overseas Navigation, Inc.

At the completion of the survey, maps will show magnetic variations to be used in laying out future geophysical programs.

An interesting by-product of the survey is expected to be the accurate relocation of all of the Bahama Islands on the map. It is understood that numerous gravity anamolies in the region have made astronomical location of the islands within precise limits almost worthless.

Kansu Daily Production Reported 1500 Gallons

It has been unofficially reported to the Department of Commerce that oil production in the Province of Kansu, China, during 1946 averaged about 1500 gallons daily, all consumed in the nearby areas.

This amount is estimated to be about 70 percent of the total Chinese oil output. An American mission employed by the Chinese Government to assist in the formulation of a program for the development of China's oil resources submitted its report during the year, but a satisfactory agreement with American and British oil companies to carry out development work was said "not yet been reached."

Plans of Chinese Petroleum Corporation for the rehabilitation of the Taiwan (Formosa) refinery, built by the Japanese during the war, provide for an eventual crude oil run of 6000 barrels daily. The National Resources Commission is said to have purchased about 2.1 million barrels of crude oil for delivery to the plant during 1947.

International Visitors in Houston

(Photo by Edward Bourdon)

A record attendance registered at the April meeting of the Houston Chapter of Nomads. A talk on the FBI by Galen N. Willis, agent in charge of the Houston office, and a movie of the Orange Bowl football games featured the evening. International guests, shown above, left to right, included: Front row—R. T. Finley, United British Oilfields of Trinidad, Point Fortin, Trinidad; D. C. Scott, Shell Company, Bogota, Colombia; R. L. Holden, Texas Petroleum Company, Barranquila, Colombia; Delbert Lewis, Calgary, Alberta, Canada; D. U. Skinner, Homco, Caracas, Venezuela. Back row—T. B. Herndon, National Supply Company, Caracas, Venezuela; N. E. Giles, Socony-Vacuum Oil Company, Caracas, Venezuela; C. B. Miller, Mene Grande Oil Company, Barcelona, Venezuela; "Sonny" Calvert, export representative, London, England.

Atlantic's Wildcat Near Port-au-Prince Testing

The Atlantic Refining Company's Culde-Sac 1, wildcat test northeast of Port-au-Prince in Haiti, is reported testing in Oligocene limestone at a total depth of 7950 feet. In the event the test is a failure, Atlantic plans to drill a shallow test, or core hole, in the vicinity of St. Marc on the Haitian west coast.

Atlantic's Jurinet 1, its second test on the island, was abandoned in 1946 at a total depth of 8804 feet in the Eocene. Its first test, the Maissade 1, drilled in the central plain area, was a failure in 1945 at 9010 feet.

The company still holds the majority interest in approximately 500,000 acres of concessions in Haiti. An undivided interest in all of these petroleum concessions is held by Haitian Petroleum Company made up primarily of Standard Oil Company (New Jersey), Seaboard Oil Company of Delaware, Case Pomeroy interests and Harold Bishop.

Two-Mile Extension for Camiri, Bolivia, Field

Estimated reserves of the Camiri field in Bolivia may be more than doubled by the discovery of a new oil-bearing formation at 1643 feet, hit by the government monopoly, YPFB, in deepening a well abandoned as a dry hole in 1931 by Standard Oil Company of Bolivia, the Department of Commerce has reported.

No test runs have been made because of the extreme pressure, it was stated. The well is two miles from nearest production, and is regarded as proving a greater extension than had previously been calculated.

Gulf of Suez Test

Standard Oil Company of Egypt (Standard of New Jersey) apparently has uncovered a new oil area for Egypt at its Wadi Baba 1, located about 200 miles southeast of Suez along the Gulf of Suez coast.

A core test, is credited with having logged an oil sand and on a test at 1432-50 feet recovered 280 feet of 9-gravity (API) crude in 45 minutes. A second test at 1467-94 feet recovered 300 feet of oil in 30 minutes. After testing the hole was deepened to 1975 feet. The significance of the field is unknown because of the low gravity of the crude. However, the company is reported to be waiting for casing and when it arrives the operators will make an effort to complete the well as a pumper.

Pemex Drilling Contract

Geologists of the Petroleos Mexicanos (Pemex), Mexico's government-owned oil company, have reported favorably on the oil deposits located 35 miles southwest of Ojinaga, Chihuahua (opposite Presidio, Texas) and the Compania Norteamericana Perforadora de Pozos of Abilene, Texas, has been contracted to start drilling immediately, according to information furnished the Department of Commerce.

Patent Roundup

A Regular Feature of THE OIL WEEKLY

In this column are reviewed patents dealing with drilling, producing and pipe line branches of the oil industry that are issued by the United States Patent Office.

Patents issued by the United States Patent Office, Washington, D. C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 25 cents per copy and can be had by addressing the Commissioner of Patents, Washington 25, D. C.

Drilling Fluid and Process

A patent (No. 2,417,307) taken by Delmar H. Larsten, Los Angeles, and assigned to National Lead Company of that city, is designed for boring or controlling wells by a watery well drilling fluid.

The process comprises adding to the fluid a thin-boiling amyl-aceous colloid which is gelatinizable in cold water and adapted to produce a low viscosity fluid with a high percentage of the colloid.

Drilling Fluid

The patent (No. 2,417,235), issued to George E. Cannon of Houston, has been assigned to Standard Oil Development Company.

This method for reducing water loss by filtration in drilling fluid including a suspension of solid mineral matter in water which comprises suspending a water-soluble starch ester of a low molecular weight aliphatic acid in the solution.

Oil Well Screen

This patent (No. 2,417,152), issued to Bessie May Collins, executrix for the estate of Danald B. Collins, Houston, has been assigned to Shell Development Company, San Francisco.

The screen comprises an outer tubular member through which there are undercut inwardly diverging slots, and an inner tubular member consisting of a cylindrical straining surface formed of spirally wound wire on the inner side of which are a number of longitudinally spaced bars, with the spirally wound wire and one of the bars split along their total length. The inner member is adapted to be inserted inside the outer member, and is forced into firm contact with the inner walls of the outer member by the expanding spring action of the wires.

Fishing Tools for Deep Wells

This deep well fishing tool patent (No. 2,416,613) was issued to William B. Costin of Monahans, Texas.

The tool has a relatively long body with a pocket formed in and opening through the lower end of the tool to provide a means for receiving a body from the bottom of a well. Retaining catches are carried by the lower portion of the body within the pocket and extend radially toward the center, a reduced stem extending upwardly from the top of the pocketed body upon the axial center and formed at its free end to provide a coupling means for connecting the tool in a well pipe line. A sleeve mounted on the upper end of the body and partly surrounding the stem is open at the top and spaced from the stem to provide a material receiving basket, the stem above the sleeve being provided with outstanding wings having their outer edges downwardly and outwardly directed, the upper end portion of the sleeve being directly engaged with the lower edges of the wings. The outer portions of the wings have parts overlying the upper portions of the sleeve, and the lower end portion of the sleeve is permanently joined with the upper portion of the body.

Well Surveying Instrument

Gottdank L. Kothny, Strafford, Pa., has assigned this patent (No. 2,415,249) to Sperry-Sun Well Surveying Company of Philadelphia.

The instrument has a means for supporting a record member, a slowly acting means for recording inclination of the instrument on the record member and fluid pressure responsive means for interrupting the recording action.

Determining Pipe Perforations

The patent (No. 2,416,441) for this process, owned by James Grant and James J. Santiago, Los Angeles, has been assigned to Grant Oil Tool Company.

Thin pliable record-forming material is lowered into a well pipe opposite its perforated area and is forced by an expansion means into the pipe perforations or non-perforated indentations. Ruptured deformation of material entering the perforations and non-ruptured deformation of the portions of the material entering the indentations is impressed and recorded on the material.

Seismometer

Herbert Hoover, Jr., Sierra Madre, Calif., has given mesne assignments on this patent (No. 2,417,077) to United Geophysical Company, Pasadena, Calif.

The instrument is portable and consists of a case having a flat base and a substantially uninterrupted domed top. The means for detection of vibrations is sealed within the case and adapted to detect movement therein which is transverse to the base. The means includes a lightweight, movably suspended coil with a natural frequency of about 15-20 cycles.

Wire Reinforced Belt

Ralph F. Lindsay, Detroit, and Allen R. Lindsay, Cleveland, have assigned this patent (No. 2,414,822) to Dayton Rubber Manufacturing Company, Dayton, Ohio.

An endless belt is reinforced with a metallic member of length greater than that of the belt arranged in spiral form with its convolutions spaced from each other and disposed to run with the belt along a neutral zone. The metallic member consists of a steel wire core plated with copper and having a further coating of rubber composition and an outer sleeve of a loose weave material around it.

Corrosion Prevention

Patent No. 2,415,161 was issued to Elza Q. Camp, Goose Creek, Texas, and has been assigned to Standard Oil Development Company.

During an operation in which petroleum distillate is contacted in vapor phase at a temperature between 1300° and 1650° F. with an iron, chromium and nickel alloy, a corrosion-inhibiting amount of low boiling, non-acidic oxygenated organic compound is incorporated in the distillate.

Well Logging

Whitman D. Mounce, Houston, has assigned patent No. 2,415,364 to Standard Oil Development Company.

Power is produced in the form of an alternating current at the surface of the earth and transmitted into the well where it is employed to produce a carrier frequency of a substantially greater frequency than the alternating current. The modification of the carrier frequently generated during one-half of each cycle of the alternating current in accordance with a characteristic of the borehole constitutes an indicating signal. The reference signal comes from maintaining the carrier frequency generated during the other half of each cycle of alternating current wholly free from varying earth characteristics. The indicating and reference portions of the carrier frequency are transmitted to the suface of the earth and the indicating portions of the carrier frequency amplified as a function of the reference portions of the carrier frequency.

Adjustable Pipe Clamp

Frederick T. Newell, Bradford, Pa., has assigned this patent (No. 2,415,753) to Dresser Industries, Inc.

This clamp applies sealing pressure to a gasket for a bell and spigot pipe joint, and consists of an anchor ring, a sectional follower ring which has a gasket engaging surface on its forward face, a rearwardly projecting bracing flange and a number of outwardly projecting slotted bolt lugs with bolts extending through the lugs and connecting the follower ring and anchor ring. Connecting, adjacent sections of the follower ring are adjustably connected to a unitary structure capable of transmitting uniform pressure to the gasket and resisting forces tending to expand and to burst the ring. The unitary structure comprises a series of spaced shoulders provided on the rear face of the gasket engaging portion of one of the end sections, the shoulders extending across the ring section in a plane intersecting the axis of the clamp. Integral extensions are provided on the adjacent follower ring section, being offset rearwardly from and projecting circumferentially beyond the gasket engaging surface of the ring section. On the forward side of the extension is a series of spaced shoulders adapted interchangeably to engage selected one of the shoulders provided on the rearward face of the follower ring section. A bolt extending through the overlapping portions of the sections and cooperating with the inter-engaging shoulders unites the sections rigidly together.

Demand

FAR EXCEEDS ESTIMATES

By L. J. LOGAN, Associate Editor

IN THE first quarter of 1947 the petroleum industry encountered much stronger demand for products than was generally expected. Whereas most forecasts projected increases of 4 to 6 percent for 1947 over 1946, the initial quarter far exceeded such estimates. Preliminary figures presented herewith indicate that the total demand for all oils averaged 5,842,000 barrels daily in the first quarter of 1947, an increase of 11.2 percent over the 5,255,000 daily of the like period of 1946 and 43.6 percent more than the demand in the initial quarter of 1941, the last prewar year for the U. S.

Seasonal Record

The indicated 5,842,000 barrels daily demand for all oils in the first quarter of 1947 was a new all-time record for the season involved, having been substantially more than the 5,575,000 daily in the initial quarter of 1945, the previous record, established in the final stages of the war.

The industry therefore is having an experience very similar to that of last year, when actual demand for petroleum materially exceeded practically all forecasts.

The above figure of an increase of 11.2 percent in total demand for all oils is subject to some revision, but it is not likely to be changed a great deal by final statistics. In computing the demand for crude and products, the important factors of production and changes in stocks were available from the weekly reports of The American Petroleum Institute and the weekly crude stocks reports of the Bureau of Mines. It was necessary to use estimates of exports and to partly estimate imports, but imports for January were available from the Department of Commerce, showing comparatively large receipts. Necessary revision of figures as here given will be mainly, therefore, corrections involving exports and imports.

As here computed, the domestic component of demand, representing 92.7 percent of total demand, shows an increase of 11.6 percent over last year for the first quarter. Exports represented 7.3 percent of total demand and showed an increase of 5.4 percent over the initial quarter of last year.

Percent Demand Increases

The most noteworthy increase in demand was that for distillate fuel oil, which averaged 1,136,000 barrels daily in the first quarter of 1947, an increase of 26.4 percent over the like period of 1946, both domestic and export demand having shown approximately that same increase. Kerosine, a closely related product, showed an increase of 18.2 percent over last year, with both domestic use and exports higher. Residual fuel showed an increase of about 7 percent in domestic demand and exports were estimated about the same as last year. Both domestic and export requirements of lubricating oils were substantially above last year. Total demand for motor fuel was about 3.6 percent higher than in last year's first quarter, although lower estimated exports partially offset an indicated increase of 5.4 percent in domestic consumption. These data indicate that demand is exceeding expectations for all products except motor fuel, which so far this year has been about in line with forecasts of a moderate rise in domestic use and somewhat lower exports. However, the heavy consuming season for gasoline still lies ahead.

Refinery Runs Heavy

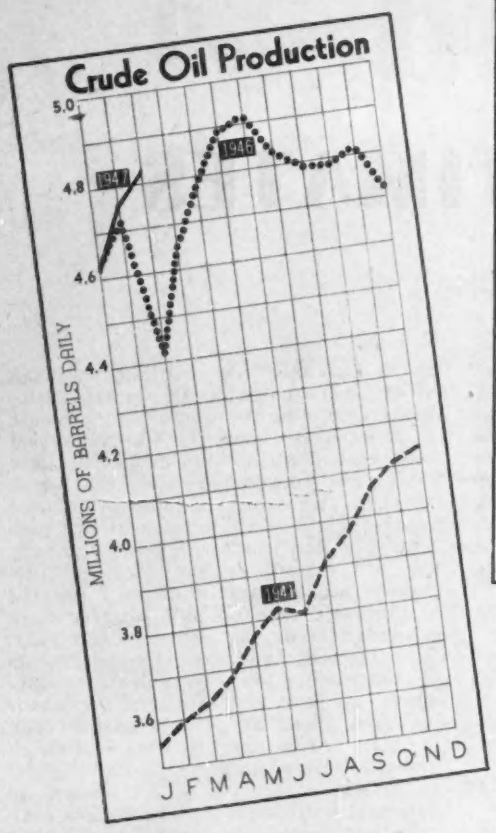
So great has been the demand for petroleum this year that its fulfillment has required exceptionally large volumes of supply from all sources, including domestic production, stocks, and imports.

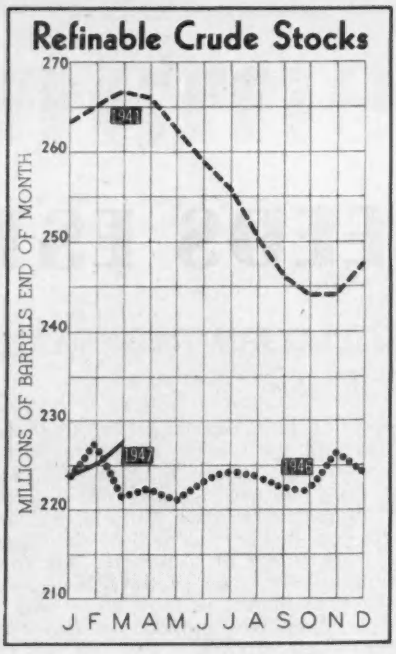
In meeting the record demand of the first quarter, refinery runs of crude averaged 4,844,000 barrels daily, up 5.1 per-

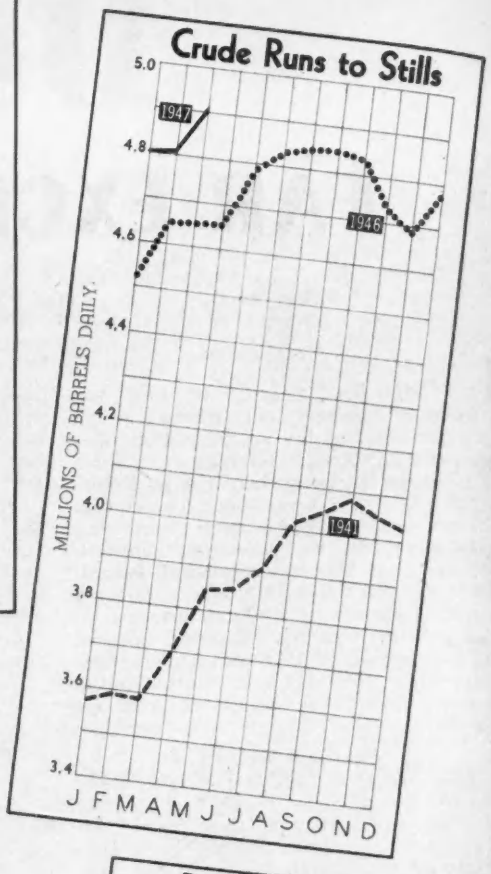
U. S. Crude Runs to Stills and Percent of Refinery Capacity Used, By Districts, March and First 3 Months, 1941, 1946, 1947

Runs from Bureau of Mines, except 1947, from American Petroleum Institute; Capacities from American Petroleum Institute.
(THOUSANDS OF BARRELS)

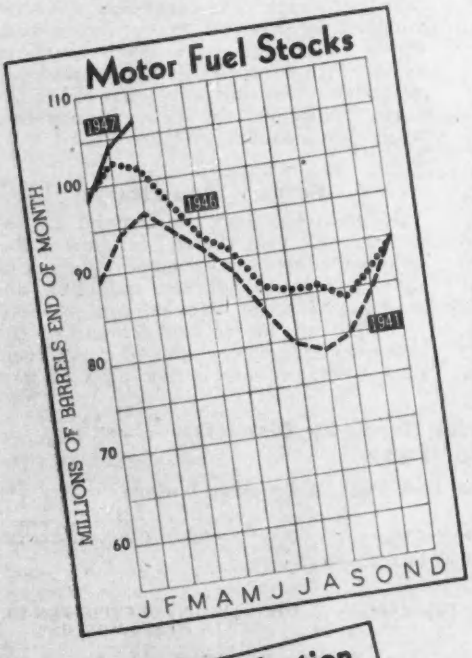
REFINING DISTRICT	CRUDE RUNS IN MARCH: Total Amount Run				CRUDE RUNS IN MARCH: Daily Average Run			REFINING CAPACITY IN USE, MARCH: Daily Capacity			REFINING CAPACITY IN USE, MARCH: Percent Capacity Used			TOTAL AMOUNT OF CRUDE RUN TO STILLS, FIRST 3 MONTHS			
	March, 1941	March, 1946	March, 1947	% Diff. '46-'47	Mar., 1941	Mar., 1946	Mar., 1947	Mar., 1941	Mar., 1946	Mar., 1947	Mar., 1941	Mar., 1946	Mar., 1947	Jan.-Mar., 1941	Jan.-Mar., 1946	Jan.-Mar., 1947	% Diff. '46-'47
East Coast	17,850	23,818	24,527	+ 3.0	576	768	791	643	791	839	89.6	97.1	94.3	50,247	68,530	67,699	— 1.2
Appalachian	4,347	4,654	5,015	+ 7.8	140	150	162	156	196	205	89.7	76.5	79.0	12,691	13,559	14,974	+10.4
District No. 1	.....	2,936	3,194	+ 8.8	.....	95	103	.....	146	143	.....	65.1	72.0	.....	8,472	9,301	+ 9.8
District No. 2	.....	1,718	1,821	+ 6.0	.....	55	59	.....	50	62	.....	110.0	95.2	.....	5,087	5,673	+11.5
Indiana, Illinois, Kentucky	19,763	22,392	25,913	+15.7	638	722	836	743	858	870	85.9	84.1	96.1	56,692	64,462	72,875	+11.5
Oklahoma, Kansas, Missouri	10,214	11,519	12,393	+ 7.6	329	372	400	420	469	469	78.3	79.3	85.3	29,148	33,417	35,425	+ 6.0
Texas Inland	5,290	6,322	6,810	+ 7.7	171	204	220	280	330	330	61.1	61.8	66.7	15,442	18,288	19,844	+ 8.5
Texas Gulf	28,164	35,923	34,660	— 3.5	908	1,159	1,118	1,071	1,237	1,226	84.9	93.7	91.2	83,309	103,067	102,337	— 0.7
Louisiana Gulf	4,000	9,716	11,104	+14.3	129	313	358	164	260	321	78.7	120.4	111.5	11,933	27,442	31,468	+14.7
Arkansas and Louisiana Inland	2,267	1,787	1,971	+10.3	73	58	63	101	127	126	72.3	45.7	50.0	6,578	5,191	5,556	+ 7.0
Rocky Mountain	2,579	4,185	4,122	— 1.5	83	135	133	121	172	178	68.6	78.5	74.7	7,525	11,319	12,255	+ 8.3
District No. 3	.....	357	313	—12.3	.....	12	10	.....	13	13	.....	92.3	76.9	.....	961	956	— 0.5
District No. 4	.....	3,828	3,809	— 0.5	.....	123	123	.....	159	165	.....	77.4	74.5	.....	10,358	11,299	+ 9.1
California	16,585	24,172	25,610	+ 5.9	535	780	826	836	967	994	64.9	80.7	83.1	48,622	69,575	73,509	+ 5.7
Total United States	111,059	144,488	152,125	+ 5.3	3,582	4,661	4,907	4,535	5,407	5,558	79.0	86.2	88.3	322,187	414,850	435,942	+ 5.1

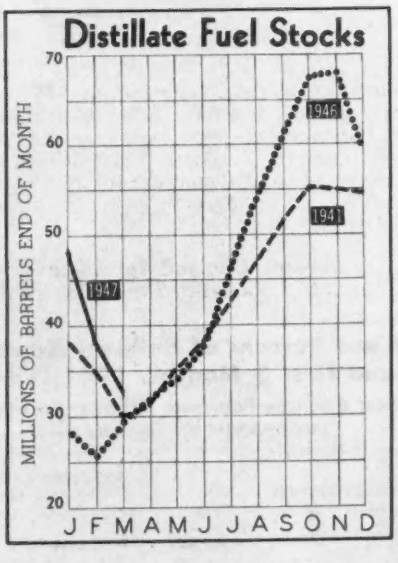


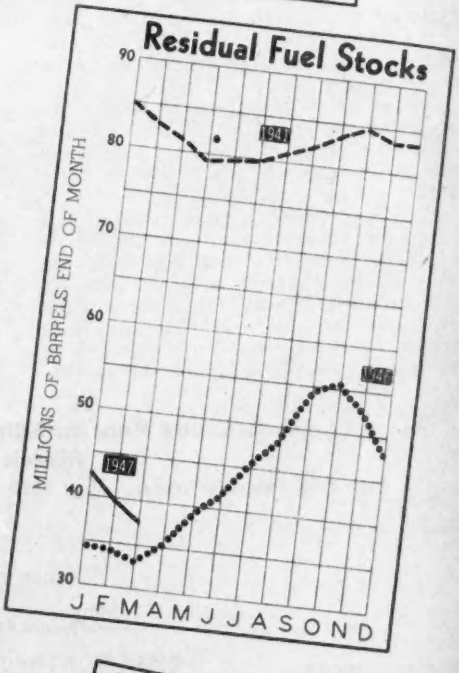


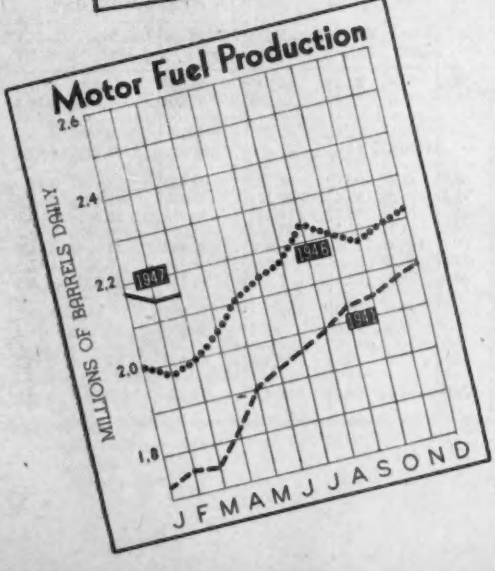


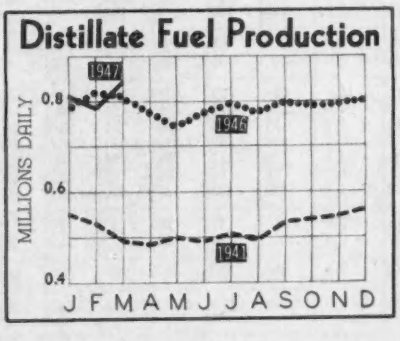
Monthly
TRENDS

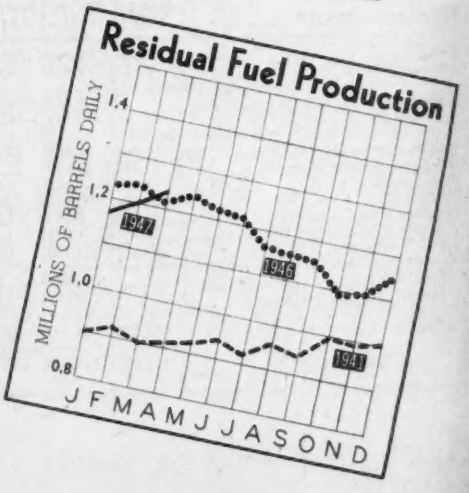












cent from the 4,610,000 daily in the first quarter of last year, and substantially in excess of the 4,736,000 barrels daily run to stills in the first quarter of 1945. The runs in this year's first quarter were above the daily averages of either of the full years 1945 or 1946. The only extended period in which they were exceeded was in May, June and July, 1945, final months of the war, during which the runs averaged between 4,900,000 and 5 million barrels daily. All-time peak runs for any month were those of 5,001,000 daily in July, 1945, and the average for March, 1947, was 4,907,000 barrels daily. All-time peak runs for any week as reported by The API were 5,140,000 barrels daily in August, 1945, and the highest for the first quarter of this year was an average of 4,986,000 barrels daily in the week ended March 15. For this year as a whole, refinery runs undoubtedly will set a new all-time record, just as did the runs for the first quarter.

Production Soars

In response to the strong demand for petroleum products, domestic production of natural gasoline and allied products was higher than in any previous first quarter, and domestic production of crude petroleum approached the highest levels on record. The crude production averaged 4,745,000 barrels daily, up 3.6 percent from the 4,581,000 daily of the first quarter of 1946, and nearly as much as the first-quarter record of 4,769,000 daily recorded in 1945. As in the case of refinery runs, domestic production of crude in this year's first quarter was somewhat above the daily averages for the full years 1945 and 1946. In March of this year, the crude output averaged 4,848,000 barrels daily, an all-time record for March, comparing with 4,414,000 daily in March, 1946, and 4,799,000 daily in March, 1945.

The March, 1947, crude production of 4,848,000 barrels daily was only a little less than the highest monthly averages on record, having been exceeded in each of the four months from May through August, 1945, when output averaged between 4,850,000 and 4,900,000 barrels daily, and in the two months of June and July, 1946, when production averaged 4,896,000 and 4,922,000 barrels daily, respectively, the latter being the highest for any month in history.

In the final week of March, 1947, U. S. crude production averaged 4,892,000 barrels daily and was close to the weekly highs of 4,944,000 daily in July, 1945, and 4,961,000 daily in mid-June, 1946, the latter being the highest for any week on record.

Heavy Withdrawals

Though U. S. crude production has been running close to the highest levels on record, as indicated above, it has not put supply into balance with demand, which has exceeded all previous comparable records. Consequently, there have been comparatively heavy withdrawals from storage and increased imports of crude and fuel oils.

Stocks of all oils were reduced 23,516,000 barrels in the first quarter of this year, an average of 261,000 barrels daily. In the first quarter of 1946 stocks were increased by 6000 barrels daily, while in the initial quarter of 1945 they were reduced by 59,000 barrels daily. This large draft on stocks in the first three

Stocks of Crude Petroleum in U. S. by Grades, at end of March

(Based on Weekly Reports of U. S. Bureau of Mines)

(THOUSANDS OF BARRELS)

Grade or Origin	March 29, 1941	March 30, 1946	March 29, 1947	Change 1941-1947
Pennsylvania Grade	4,291	2,162	2,061	— 2,230
Other Appalachian	1,400	1,608	1,550	+ 150
Lima-Michigan	1,114	1,041	1,033	— 81
Illinois-Indiana	21,807	18,704	12,381	— 9,426
Arkansas	2,888	2,608	2,914	+ 26
Kansas	8,961	9,542	8,323	— 638
Louisiana	12,897	11,368	11,793	— 1,104
Northern	4,342	2,987	3,261	— 1,081
Gulf Coast	8,555	8,381	8,532	— 23
Mississippi	789	2,485	3,249	+ 2,460
New Mexico	7,222	5,744	6,365	— 857
Oklahoma	64,276	35,851	28,610	— 35,666
Texas	85,178	102,914	110,539	+ 25,361
East Texas	20,561	16,570	16,915	— 3,646
West Texas	15,953	35,027	39,939	+ 25,986
Gulf Texas	23,544	26,683	30,620	— 7,076
Other Texas	25,120	24,634	23,065	— 2,055
Panhandle	.....	4,498	3,919	.....
North	.....	6,412	5,383	.....
South	.....	5,244	5,598	.....
Other	.....	8,480	8,165	.....
Rocky Mountain	15,575	8,003	10,049	— 5,526
California	37,221	19,917	23,305	— 13,916
Foreign	2,568	3,047	5,357	+ 2,789
Total Gasoline Bearing in U.S.	266,187	224,994	227,529	— 38,658
Heavy in California	11,963	4,505	5,912	— 6,051
Tota in U.S.	278,150	229,499	233,441	— 44,709

U. S. Crude Production, by States and Districts, March and First 3 Months

From U. S. Bureau of Mines, except 1947, estimated from A.P.I. weekly reports.

(THOUSANDS OF BARRELS)

STATE OR DISTRICT	MONTH TOTAL, MARCH				DAILY AVERAGE IN MARCH			TOTAL FIRST 3 MONTHS			
	1941	1946	1947	% Diff. 1946-47	1941	1946	1947	1941	1946	1947	% Diff. 1946-47
Alabama	.....	34	30	—11.8	.....	1.1	1.0	.....	89	80	—10.1
Arkansas	2,191	2,352	2,295	— 2.4	70.7	75.9	74.0	6,299	6,886	6,625	— 3.8
California	18,903	26,420	27,997	+ 6.0	609.8	852.2	903.1	54,941	76,179	80,390	+ 5.5
Colorado	125	812	1,128	+38.9	4.0	26.2	36.4	355	2,231	3,310	+48.4
Florida	.....	3	5	+66.7	.....	0.1	0.2	.....	10	18	+80.0
Illinois	10,267	6,443	5,908	— 8.3	331.2	207.9	190.6	29,415	18,719	17,384	— 7.1
Indiana	642	599	546	— 8.8	20.7	19.3	17.6	1,841	1,585	1,605	+ 1.3
Kansas	6,258	7,778	8,290	+ 6.6	201.9	250.9	267.4	17,968	22,778	23,804	+ 4.5
Kentucky	414	929	839	— 9.7	13.4	30.0	27.1	1,225	2,630	2,490	— 5.3
Louisiana	9,418	11,635	12,598	+ 8.3	303.8	375.3	406.4	26,687	33,847	36,578	+ 8.1
North Louisiana	2,096	2,395	2,944	+22.9	67.6	77.3	95.0	6,116	6,781	8,517	+25.6
South Louisiana	7,322	9,240	9,654	+ 4.5	236.2	298.0	311.4	20,571	27,066	28,061	+ 3.7
Michigan	1,189	1,482	1,329	—10.3	38.4	47.8	42.9	3,510	4,150	3,848	— 7.3
Mississippi	570	1,663	2,650	+59.4	18.4	53.6	85.5	1,724	4,914	7,708	+56.9
Missouri	4	5	4	—20.0	0.1	0.2	0.1	11	16	12	—25.0
Montana	598	744	686	— 7.8	19.3	24.0	22.1	1,756	2,143	1,977	— 7.7
Nebraska	113	22	21	— 4.5	3.6	0.7	0.7	337	68	61	—10.3
New Mexico	3,268	3,063	3,235	+ 5.6	105.4	98.8	104.4	9,406	8,852	9,347	+ 5.6
New York	410	398	385	— 3.3	13.2	12.8	12.4	1,206	1,186	1,173	— 1.1
Ohio	273	242	265	+ 9.5	8.8	7.8	8.6	806	690	682	— 1.2
Oklahoma	13,005	11,139	11,415	+ 2.3	419.5	359.3	368.2	37,711	33,965	32,989	— 2.9
Pennsylvania	1,336	1,066	1,042	— 2.3	43.1	34.4	33.6	3,983	3,096	3,060	— 1.2
Tennessee	1	1	1	.....	.....	.....	.....	3	3	2	—33.3
*Texas	41,030	56,579	65,949	+16.6	1,323.6	1,825.1	2,127.4	116,814	178,613	183,437	+ 2.7
Dist. 1—South Central	620	581	637	+ 9.6	20.0	18.8	20.6	1,829	1,722	1,786	+ 3.7
Dist. 2—Middle Gulf	1,916	3,468	4,883	+40.8	61.8	111.9	157.5	5,242	11,580	13,088	+13.0
Dist 3—Upper Gulf	7,076	11,673	15,070	+29.1	228.2	376.3	486.1	20,398	39,704	40,460	+ 1.9
Dist 4—Lower Gulf-South West	4,004	5,820	7,483	+28.6	129.2	187.7	241.4	11,600	18,854	20,124	+ 6.7
Dist. 5—East Central	590	1,020	1,185	+16.2	19.0	32.9	38.2	1,814	3,457	3,250	— 6.0
Dist. 6—Northeast	12,982	12,744	13,154	+ 3.2	418.8	411.1	424.3	36,791	37,373	37,729	+ 1.0
Dist. 7-B—North Central	805	944	1,130	+ 2.0	26.0	30.5	36.5	2,352	2,847	3,193	+12.2
Dist. 7-C—West	535	767	1,080	+40.8	17.3	24.7	34.8	1,539	2,322	2,845	+22.5
Dist. 8—West	6,539	12,814	14,678	+14.5	210.9	413.4	473.5	18,335	40,944	42,250	+ 3.2
Dist. 9—North	3,185	3,589	4,026	+12.2	102.7	115.8	129.9	9,344	10,958	11,221	+ 2.4
Dist. 10—Panhandle	2,275	2,623	2,623	.....	73.4	84.6	84.6	6,055	7,682	7,491	— 2.5
Utah	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Virginia	.....	.....	5	.....	.....	.....	0.2	.....	.....	.....	.....
West Virginia	276	250	227	— 9.2	8.9	8.1	7.3	811	729	721	— 1.1
Wyoming	2,357	3,176	3,427	+ 7.9	76.0	102.5	110.5	7,917	8,953	9,738	+ 8.8
Total U.S.	112,648	136,835	150,278	+ 9.8	3,798.6	4,414.0	4,847.7	323,753	412,332	427,039	+ 3.6

* Texas data by districts based on Texas Railroad Commission, and so do not agree exactly with State totals, which are on Bureau of Mines basis.

Demand for and Supply of All Oils, Crude Oil, Motor Fuel, Kerosine, Fuel Oils, and Lubricants

Sources: 1941 and 1946 from Bureau of Mines; 1947 estimated with aid of A.P.I. Statistical Bulletins.

(THOUSANDS OF BARRELS)

ITEM	First 3 Months 1941	First 3 Months 1946	First 3 Months 1947	% Diff. 1941-1947	% Diff. 1946-1947
ALL OILS					
Domestic Production, Total	339,530	441,268	457,989	+ 34.9	+ 3.8
(Daily Average)	3,773	4,903	5,089	+ 34.9	+ 3.8
Crude Petroleum	324,255	412,332	427,039	+ 31.7	+ 3.6
(Daily Average)	3,603	4,581	4,745	+ 31.7	+ 3.6
Natural Gasoline	14,365	28,216	30,500	+112.3	+ 8.1
(Daily Average)	160	314	339	+112.3	+ 8.1
Bensol	910	720	450	— 50.5	— 37.5
(Daily Average)	10	8	5	— 50.5	— 37.5
Imports, Total	21,259	32,290	44,240	+108.1	+ 37.0
(Daily Average)	236	359	492	+108.1	+ 37.0
Crude Petroleum	9,935	20,516	27,500	+175.4	+ 34.0
(Daily Average)	111	228	306	+175.4	+ 34.0
Refined Products	11,274	11,774	16,740	+ 48.5	+ 42.2
(Daily Average)	125	131	186	+ 48.5	+ 42.2
Changes in Stocks, All Oils	—5,285	+565	—23,516	.....	.....
(Daily Average)	— 59	+ 6	— 261	.....	.....
Stocks, Beginning of Period	562,647	463,579	507,094	— 9.9	+ 9.4
Refinable Crude	264,079	218,763	224,473	— 15.0	+ 2.6
Heavy Crude in California	11,906	4,496	5,703	— 52.1	+ 26.8
Refined Products	280,958	235,998	271,937	— 3.2	+ 15.2
Natural Gasoline	5,704	4,322	4,981	— 12.7	+ 15.2
Stocks, End of Period	557,362	464,144	483,578	— 13.2	+ 4.2
(Days' Supply)	137	88	83	— 13.2	+ 4.2
Refinable Crude	266,380	221,400	227,529	— 14.6	+ 2.8
Heavy Crude in California	11,776	4,528	5,912	— 49.8	+ 30.6
Refined Products	273,875	231,558	242,837	— 11.3	+ 4.9
Natural Gasoline	5,331	6,658	7,300	+ 36.9	+ 9.6
Demand, Total	366,074	472,993	525,745	+ 43.6	+ 11.2
(Daily Average)	4,068	5,255	5,842	+ 43.6	+ 11.2
Exports, Total	19,686	36,486	38,450	+ 95.3	+ 5.4
(Daily Average)	219	405	427	+ 95.3	+ 5.4
Crude Petroleum, Total	5,017	6,649	6,500	+ 29.6	— 2.2
(Daily Average)	56	74	72	+ 29.6	— 2.2
Refined Products, Total	14,669	29,837	31,950	+117.8	+ 7.1
(Daily Average)	163	331	355	+117.8	+ 7.1
Domestic Demand, Total	346,388	436,507	487,295	+ 40.7	+ 11.6
(Daily Average)	3,849	4,850	5,415	+ 40.7	+ 11.6
CRUDE PETROLEUM					
Supply:					
Domestic Production, Total	323,753	412,332	427,039	+ 31.9	+ 3.6
(Daily Average)	3,597	4,582	4,745	+ 31.9	+ 3.6
Imports, Total	9,985	20,516	27,500	+175.4	+ 34.0
(Daily Average)	111	228	306	+175.4	+ 34.0
Change in Stocks, (incl, Calif hvy.)	+2,166	+2,669	+3,265	.....	.....
(Daily Average)	+ 24	+ 30	+ 36	.....	.....
Stocks, Beginning of Period	276,615	223,259	230,176	— 16.8	+ 3.1
Stocks, End of Period	278,781	225,928	233,441	— 16.3	+ 3.3
(Days' Supply)	76	47	47	— 38.2	.....
Supply, Total	331,572	430,179	451,274	+ 36.1	+ 4.9
(Daily Average)	3,684	4,780	5,014	+ 36.1	+ 4.9
Demand:					
Runs to Stills, Total	322,187	414,850	435,942	+ 35.3	+ 5.1
(Daily Average)	3,580	4,610	4,844	+ 35.3	+ 5.1
Domestic Crude	311,814	394,653	409,742	+ 31.4	+ 3.8
(Daily Average)	3,465	4,385	4,553	+ 31.4	+ 3.8
Foreign Crude	10,373	20,197	26,200	+152.6	+ 29.7
(Daily Average)	115	225	291	+152.6	+ 29.7
Exports, Total	4,946	6,649	6,500	+ 31.4	— 2.2
(Daily Average)	55	74	72	+ 31.4	— 2.2
Transfers to Fuel Oil Stocks	2,921	5,432	5,715	+ 95.7	+ 5.2
(Daily Average)	32	60	64	+ 95.7	+ 5.2
Distillate Fuel Oil	630	716	765	+ 21.4	+ 6.8
Residual Fuel Oil	2,291	4,716	5,950	+159.7	+ 26.2
Used as Fuel, and Losses	1,518	3,248	3,117	+105.3	— 4.0
(Daily Average)	17	36	35	+105.3	— 4.0
Demand, Total	331,572	430,179	451,274	+ 36.1	+ 4.9
(Daily Average)	3,684	4,780	5,014	+ 36.1	+ 4.9
DISTILLATE FUEL OIL					
Production, Total	47,076	72,735	73,080	+ 55.2	+ 0.5
(Daily Average)	523	808	812	+ 55.2	+ 0.5
Percent Yield from Crude	14.6	17.5	16.8	.....	.....
Transfers from Crude	630	716	765	+ 21.4	+ 6.8
(Daily Average)	7	8	9	+ 21.4	+ 6.8
Imports, Total	1,257	1,590	1,493	+ 18.8	— 6.5
(Daily Average)	14	18	17	+ 18.8	— 6.5
Change in Stocks	—12,931	—5,856	—26,883	.....	.....
(Daily Average)	— 144	— 65	— 299	.....	.....
Stocks, Beginning of Period	42,940	35,778	59,620	+ 38.8	+ 66.6
Stocks, End of Period	30,009	29,922	32,737	+ 9.1	+ 9.4
(Days' Supply)	44	33	29	— 34.1	— 12.1
Demand, Total	61,894	80,897	102,221	+ 65.2	+ 26.4
(Daily Average)	688	899	1,136	+ 65.2	+ 26.4
Exports, Total	3,423	6,279	7,900	+130.7	+ 25.8
(Daily Average)	38	70	88	+130.7	+ 25.8
Domestic Demand	58,471	74,618	94,321	+ 61.3	+ 26.4
(Daily Average)	650	829	1,048	+ 61.3	+ 26.4

ITEM	First 3 Months 1941	First 3 Months 1946	First 3 Months 1947	% Diff. 1941-1947	% Diff. 1946-1947
MOTOR FUEL					
Production, Total	154,325	179,517	194,627	+ 26.1	+ 8.4
(Daily Average)	1,715	1,995	2,163	+ 26.1	+ 8.4
Refinery Gasoline, Total	139,050	156,899	171,377	+ 23.2	+ 9.2
(Daily Average)	1,545	1,743	1,904	+ 23.2	+ 9.2
(Yield from Crude)	43.2	37.8	39.3	.....	.....
Cracked	75,590	88,365	.....	.....	.....
Straight Run	63,460	68,534	.....	.....	.....
Natural Gasoline, etc	14,365	28,216	30,500	+112.3	+ 8.1
(Daily Average)	160	314	339	+112.3	+ 8.1
Less Sales of L.P.G.	.....	6,056	7,330	.....	.....
Less transfers cycle prods	.....	262	370	.....	.....
Bensol	910	720	450	— 50.5	— 37.5
Imports, Total	1	.....	.....	—100.0	.....
(Daily Average)	.....	.....	.....	.....	.....
Change in Stocks	+13,185	+8,162	+17,110	.....	.....
(Daily Average)	+ 146	+ 91	+ 190	.....	.....
Stocks, Beginning of Period	83,647	93,682	89,515	+ 7.0	— 4.4
Finished Gasoline	77,943	89,360	84,534	+ 8.5	— 5.4
Natural Gasoline	5,704	4,322	4,981	— 12.7	+ 15.2
Stocks, End of Period	96,832	101,844	106,625	+ 10.1	+ 4.7
(Days' Supply)	62	53	54	— 12.9	+ 1.9
Finished Gasoline	91,501	95,186	99,325	+ 8.6	+ 4.3
Natural Gasoline	5,331	6,658	7,300	+ 36.9	+ 9.6
Demand, Total	141,141	171,355	177,517	+ 25.8	+ 3.6
(Daily Average)	1,568	1,904	1,972	+ 25.8	+ 3.6
Exports, Total	5,036	15,479	13,200	+161.1	— 14.7
(Daily Average)	56	172	146	+161.1	— 14.7
Domestic Demand	136,105	155,876	164,317	+ 20.7	+ 5.4
(Daily Average)	1,512	1,732	1,826	+ 20.7	+ 5.4
KEROSINE					
Production, Total	18,582	29,046	28,171	+ 51.6	— 3.0
(Daily Average)	206	323	313	+ 51.6	— 3.0
Percent Yield from Crude	5.8	7.0	6.5	.....	.....
Imports, Total	43	.....	.....	—100.0	.....
(Daily Average)	.....	.....	.....	.....	.....
Change in Stocks	—2,788	—1,129	—7,509	.....	.....
(Daily Average)	— 31	— 13	— 83	.....	.....
Stocks, Beginning of Period	9,512	10,421	17,081	+ 79.6	+ 63.9
Stocks, End of Period	6,724	9,292	9,572	+ 42.4	+ 3.0
(Days' Supply)	28	28	24	— 14.3	— 14.3
Demand, Total	21,413	30,175	35,680	+ 66.6	+ 18.2
(Daily Average)	238	335	396	+ 66.6	+ 18.2
Exports, Total	339	1,385	2,250	+563.7	+ 63.4
(Daily Average)	4	15	25	+563.7	+ 63.4
Domestic Demand	21,074	28,790	33,430	+ 58.6	+ 16.2
(Daily Average)	234	320	371	+ 58.6	+ 16.2
LUBRICATING OILS					
Production, Total	8,278	10,340	12,207	+ 47.5	+ 18.1
(Daily Average)	92	115	136	+ 47.5	+ 18.1
Percent Yield from Crude	2.6	2.5	2.8	.....	.....
Import, Total	.....	.....	35	.....	.....
(Daily Average)	.....	.....	.....	.....	.....
Change in Stocks	—130	+178	—64	.....	.....
(Daily Average)	— 1	+ 2	— 1	.....	.....
Stocks, Beginning of Period	8,767	7,773	7,564	— 13.7	— 2.9
Stocks, End of Period	8,637	7,951	7,500	— 13.2	— 5.7
(Days' Supply)	93	70	55	— 40.9	— 21.4
Demand, Total	8,408	10,162	12,306	+ 46.4	+ 21.1
(Daily Average)	93	113	137	+ 46.4	+ 21.1
Exports, Total	1,981	2,636	3,900	+ 96.9	+ 48.0
(Daily Average)	22	29	43	+ 96.9	+ 48.0
Domestic Demand	6,427	7,526	8,406	+ 30.8	+ 11.7
(Daily Average)	71	84	94	+ 30.8	+ 11.7
RESIDUAL FUEL OIL					
Production, Total	81,795	110,329	108,567	+ 32.7	— 1.6
(Daily Average)	909	1,226	1,206	+ 32.7	— 1.6
Percent Yield from Crude	25.4	26.6	24.9	.....	.....
Transfers from Crude	2,291	4,716	4,950	+116.0	+ 5.0
(Daily Average)	25	53	55	+116.0	+ 5.0
Imports, Total	9,682	9,839	14,800	+ 52.9	+ 50.4
(Daily Average)	108	109	164	+ 52.9	+ 50.4
Change in Stocks	—6,405	—4,163	—9,642	.....	.....
(Daily Average)	— 71	— 46	— 107	.....	.....
Stocks, Beginning of Period	89,304	37,158	47,094	— 47.3	+ 26.7
Stocks, End of Period	82,899	32,995	37,452	— 54.8	+ 13.5
(Days' Supply)	74	23	24	— 67.6	+ 4.3
Demand, Total	100,173	129,047	137,959	+ 37.7	+ 6.9
(Daily Average)	1,113	1,434	1,533	+ 37.7	+ 6.9
Exports, Total	3,183	2,520	2,500	— 21.5	— 0.8
(Daily Average)	35	28	27	— 21.5	— 0.8
Domestic Demand	96,990	126,527	135,459	+ 39.7	+ 7.1
(Daily Average)	1,078	1,406	1,505	+ 39.7	+ 7.1

Refinery Production of Major Products and Percent Yield from Crude Run at U. S. Refineries

Results in March and first 3 months, 1947, compared with those in like periods last year and in 1941, last pre-war year for U. S. All data from U. S. Bureau of Mines except data for 1947, estimated with aid of A.P.I. weekly bulletins.

(THOUSANDS OF BARRELS)

ITEM	1941	1946	1947	% Diff. '41-'47	% Diff. '46-'47
*GASOLINE:					
Production, March	51,950	58,914	65,026	+ 25.2	+ 10.4
(Daily Average)	1,676	1,900	2,098	+ 25.2	+ 10.4
Percent Yield from Crude	43.4	37.8	38.6	.....	.....
Production, Jan.-March	149,964	171,003	188,877	+ 25.9	+ 10.5
(Daily Average)	1,666	1,900	2,099	+ 25.9	+ 10.5
KEROSINE:					
Production, March	6,033	9,852	9,618	+ 59.4	— 2.4
(Daily Average)	195	318	310	+ 59.4	— 2.4
Percent Yield from Crude	5.4	7.0	6.3	.....	.....
Production, Jan.-March	18,582	29,046	28,171	+ 51.6	— 3.0
(Daily Average)	206	323	313	+ 51.6	— 3.0
DISTILLATE FUEL OIL:					
Production, March	15,326	25,298	26,011	+ 69.7	+ 2.8
(Daily Average)	494	816	839	+ 69.7	+ 2.8
Percent Yield from Crude	13.8	17.5	17.1	.....	.....
Production, Jan.-March	47,076	72,735	73,080	+ 55.2	+ 0.5
(Daily Average)	523	808	812	+ 55.2	+ 0.5
RESIDUAL FUEL OIL:					
Production, March	27,858	37,598	38,439	+ 38.0	+ 2.2
(Daily Average)	899	1,213	1,240	+ 38.0	+ 2.2
Percent Yield from Crude	25.1	26.6	25.3	.....	.....
Production, Jan.-March	81,795	110,329	108,567	+ 32.7	— 1.6
(Daily Average)	909	1,226	1,206	+ 32.7	— 1.6
LUBRICANTS:					
Production, March	2,813	3,786	4,260	+ 51.4	+ 12.5
(Daily Average)	90	122	137	+ 51.4	+ 12.5
Percent Yield from Crude	2.5	2.5	2.8	.....	.....
Production, Jan.-March	8,278	10,340	12,207	+ 47.5	+ 18.1
(Daily Average)	92	115	136	+ 47.5	+ 18.1

* Production includes straight run, cracked, and natural blended at refineries. Yield indicates percent of crude runs made into straight run and cracked gasoline.

months of this year was necessary in meeting the heavy requirements of fuel oils and was made possible by the comparatively large accumulations of those oils in the latter half of 1946 in the face of some doubts that such large stocks would be needed. In the 1947 first quarter the industry took from storage nearly 27 million barrels of distillate fuel oils, 7½ million barrels of kerosine, and more than 9½ million barrels of residual fuel oil, while it accumulated in storage 17 million barrels of motor fuel and about 3 million barrels of crude. Last fall the stocks of distillate fuel oil appeared mountain-like, but the judgment of those who stored it was confirmed before the winter was over.

At the end of March, 1947, total stocks of all oils stood at 483,578,000 barrels and were 4.2 percent above the 464,144,000 barrels held March 31, 1946, but with demand higher, the stocks represented only 83 days' supply compared with 88 days' supply afforded by the stocks of the end of March, 1946. The industry still is in the war-caused situation in which stocks of oils are comparatively light. In comparison with the 483,578,000 barrels or 83 days' supply of all oils held March 31, 1947, the stocks amounted to 557,362,000 barrels or 137 days' supply at the end of March, 1941.

In relation to demand, stocks are somewhat lighter now than a year ago, indicating that this year will bring a repetition of last year's experience, in which operations were intensified in the latter half of the year in meeting motor fuel demand and accumulating stocks of fuel oils for fall and winter use. At the end of March, 1947, distillate fuel oil stocks of 32,737,000 barrels were only slightly above the 29,922,000 barrels held a year previously and represented but 29 days' supply against 33 days' supply a year before. Kerosine stocks of 9,572,000 barrels or 24 days' supply compared with 9,292,000 barrels or 28 days' supply. Residual fuel oil stocks of 37,452,000 barrels or 24 days' supply compared with 32,995,000 barrels or 23 days' supply. Motor fuel stocks of 106,625,000 barrels or 54 days' supply compared with 101,844,000 barrels or 53 days' supply a year previously. Crude petroleum stocks were up to 233,441,000 barrels from 225,928,000 a year before but still represented 47 days' supply, the same as a year earlier. As stated before, stocks of all oils in the aggregate were down to 83 days' supply from 88 days' a year before.

Along with high domestic production and large withdrawals from storage, there were increased rates of imports in the first quarter of 1947, as indicated by recent trends and the reported comparatively large receipts of January. Department of Commerce figures showed that in January, 1947, total petroleum imports set a new all-time record of 15,220,000 barrels or 491,000 barrels daily, after averaging 441,000 daily in December, 1946. January receipts included 289,000 barrels daily of crude petroleum and 202,000 daily of refined products, the latter having consisted of 180,000 daily of residual fuel oil, 18,000 daily of distillate fuel oil, 2000 daily of asphalt, and 2000 daily of unfinished oils. The imports included 249,000 daily from Venezuela, 178,000 daily from the Netherlands West Indies, 26,000 daily from Mexico, 32,000 daily from Colombia, and 6000 daily from other countries. For the purposes of this article, it was assumed that February and March brought no radical changes in imports from the January rates.

While imports are at relatively high levels, one of the important reasons is that the U. S. continues to be an important exporter of oils. Even the current rates of imports are almost matched by exports, which have been here estimated at 427,000 barrels daily for the first quarter of 1947, up 5.4 percent from the 405,000 daily of the like period of 1946. and comparing with an average of 414,000 daily for the whole year 1946. Whereas the U. S. has been traditionally a net exporter of petroleum, with outgoing shipments exceeding imports, it broke away from that tradition last fall. Exports still exceeded imports in September, 1946, but imports exceeded exports somewhat in each of the months, October, November and December, 1946. In 1947, the nation apparently is continuing to import more than it exports, by an increased margin.

Stocks of Major Petroleum Products Held by Refining Companies in the United States At End of March, Compared with 1941 and 1946

Stocks at refineries, at bulk terminals, in transit, and in pipe lines. Data for 1941 and 1946 from Bureau of Mines monthly reports; for 1947 from weekly reports of American Petroleum Institute.

(THOUSANDS OF BARRELS)

DISTRICT	FINISHED AND UNFINISHED GASOLINE Stocks End of March			KEROSINE Stocks End of March			GASOIL AND DISTILLATE FUEL Stocks End of March			RESIDUAL FUEL OIL Stocks End of March		
	1941	1946	1947	1941	1946	1947	1941	1946	1947	1941	1946	1947
East Coast	21,113	22,742	22,911	1,146	4,402	4,341	7,998	9,622	9,149	8,371	6,100	6,189
Appalachian	3,628	4,220	3,720	139	276	218	350	466	405	521	441	325
District No. 1	.....	3,071	2,771	.....	235	194	.....	395	340	.....	225	234
District No. 2	.....	1,149	949	.....	41	24	.....	71	65	.....	216	91
Indiana, Illinois, Kentucky	20,782	24,250	22,760	806	1,230	1,120	2,397	3,695	2,420	2,801	3,086	1,891
Oklahoma, Kansas, Missouri	9,230	9,994	10,959	453	412	351	1,034	1,486	1,171	2,016	1,153	896
Inland Texas	2,965	3,071	4,500	141	215	176	188	280	313	1,601	668	721
Texas Gulf Coast	17,061	15,372	15,402	2,190	1,256	1,585	6,291	5,049	5,843	7,376	4,618	5,304
Louisiana Gulf Coast	3,681	4,664	5,445	556	630	725	1,119	1,682	1,968	2,303	1,018	1,395
North Louisiana and Arkansas	853	1,776	2,020	203	221	187	240	506	430	460	164	119
Rocky Mountain	2,493	2,884	3,291	119	120	62	332	398	517	565	631	721
District No. 3	.....	104	88	.....	12	16	.....	16	33	.....	28	39
District No. 4	.....	2,780	3,203	.....	108	46	.....	382	484	.....	603	682
California	17,116	15,188	16,568	971	530	807	10,060	6,738	10,521	56,885	15,116	19,891
Total United States	98,922	104,161	107,576	6,724	9,292	9,572	30,009	29,922	32,737	82,899	32,995	37,452

By CHARLES M. O'LEARY,
Consulting Industrial Engineer,
Los Angeles

Torque-Converter FOR OIL WELL

THE hydraulic torque converter, reduced to its simplest definition, is an instrument for "converting" or multiplying torque. It cannot multiply horsepower under any condition. In fact, there is an actual loss in the horsepower delivered by the engine in transmitting power through the converter. The torque converter efficiency curve starts at zero efficiency, i.e., the ratio of output speed to input speed is zero, and at which point the torque is at maximum, usually five times the engine torque. As the ratio of output speed to input speed rises, the torque decreases and the efficiency of the converter increases. Efficiency of the converter rises to 80 percent when the ratio of output speed to input speed rises to 30 percent. Since the converter provides a means of obtaining a high starting torque usually required for a standing start, the unit has a most ideal application in oil well rigs and similar industrial applications.

During the past several years, oil companies and equipment manufacturers have shown increasing interest in the engineering data, comparative efficiencies and general applicability of hydraulic torque converters to drilling rigs, servicing units, mud pumps and similar power driven equipment. Converters have been installed on drilling and service equipment, and results generally have been encouragingly satisfactory. However, two problems most commonly encountered are (1) provision of adequate and efficient cooling of the power fluid; and (2) adaptation of proper gear ratios to the particular horsepower and speed ranges of the engines so as to hold the unit within the 80 percent efficiency range through all operations.

This article reviews briefly the engineering data, calculations and other pertinent, practical information relating to the use of the hydraulic torque converter, to tie in this information with developments to date on its application to oil well drilling equipment. This first installment takes up the basic principles of operation, along with some of the applications. The concluding installment will discuss gear ratios and some of the mathematics involved in calculating them, use of the converter as a brake, and recent developments in the field of automatic drilling, in which the converter plays an important role.

The hydrokinetic torque converter was invented in 1905 by Herman Föttinger, a German hydraulic engineer, for use in connection with boat propulsion. Later it was applied to rail car use, and in the early 1920's it was applied to bus drives in London. In 1936 the torque converter was introduced in the U. S. for motor bus use.

The torque converter may be described briefly as a turbine, designed to operate on fluid instead of steam. The fluid travels in a circular path, returning to the driving member of the turbine to be reused. Figure 1 diagrammatically illustrates the path followed by the fluid. Movement of the fluid along this path is a continuous process.

The ability of a torque converter to multiply engine torque provides a very high starting torque for the work or output side of the shaft. For example, torque converters which can multiply engine torque five times are not uncommon, and this quintupled engine torque is instantly available to the work merely by opening the engine throttle all the way. Direct-driven oil well rigs cannot multiply the engine torque delivered in any gear ratio beyond the ordinary torque provided by that ratio.

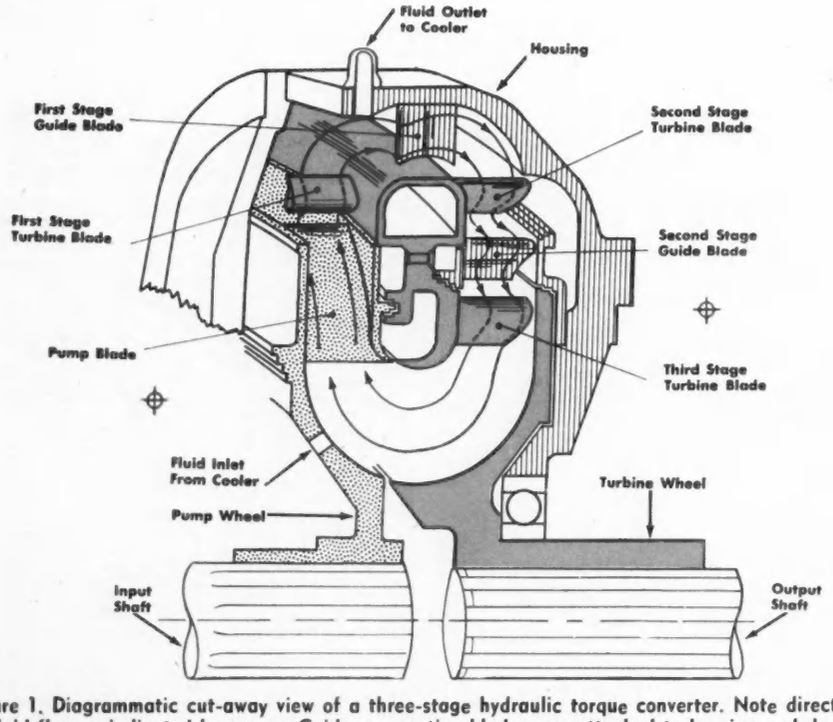


Figure 1. Diagrammatic cut-away view of a three-stage hydraulic torque converter. Note direction of fluid flow as indicated by arrows. Guide, or reaction blades, are attached to housing and do not rotate as do the pump and turbine blades.

Blading System

The way a torque converter affects this quintuple torque multiplication really is simple, although it is not thoroughly understood by all. In a torque converter drive, the engine drives a centrifugal pump that forces fluid progressively against three series of movable, or "turbine" blades, all of which are integrally attached to the "turbine," which in turn is integrally attached to the output shaft of the converter, the latter also being called the "output member." Spaced between the first and second series of turbine blades is a stationary series of blades called "reaction blades," and between the second and third set of turbine blades is another, or second series of reaction blades.

The turbine blades are streamlined and their surfaces are scientifically curved. The fluid from the centrifugal pump strikes the first series of turbine blades, follows the curvature of these blades and imparts force to the turbine, to which all the turbine blades are attached. The fluid leaves this first series of turbine blades and travels in a direction away from the direction of rotation of the turbine. The fluid then strikes the first series of reaction blades.

The surface of these reaction blades is also streamlined and scientifically curved. the curvature of the curved surface be-

Drives

DRILLING RIGS

Part 1

ing in a direction opposite to that of the first series of turbine blades, and pointing so as to direct the fluid into the second series of turbine blades.

The second series of turbine blades is also connected to the turbine and adds its force to movement of the turbine.

In leaving the second series of turbine blades, the fluid is also travelling away from the direction of rotation of the turbine. The fluid then strikes the second series of reaction blades, directing the fluid against the third series of turbine blades, which constitutes the last stage of the turbine.

The discharge of fluid from the last stage of the turbine is directed into the intake of the centrifugal pump and is recirculated through the converter, repeating the above steps (Figure 1).

The ability to increase torque in the torque converter drive lies in the three turbine stages and the two series of reaction blades. Without reaction blades there could be no torque multiplication.

An example of this is seen by holding a garden hose with a full stream of water at high pressure about eight inches from a wall, and then moving the hose toward the wall. This will cause the holder of the hose to feel the hose push back. This backward push is "reaction." If the hose is now moved backward the reaction will reduce. This same reaction to flow force works on the turbine blades of a torque converter—hundreds of times per minute—and produces "torque multiplication."

Reaction Blades

The reaction blades perform two functions: the first is to keep the fluid moving in a direction to cause direct force to be imparted to the turbine. This is an addition to the force applied to the turbine through the first series of turbine blades by the pump.

The second function is the production of multiplied torque on the turbine. This is done in the following manner: as the turbine blades pass the reaction blades the fluid flow from the turbine blades is

About The Author

CHARLES M. O'LEARY is well known in the oil industry in connection with the designing and manufacturing of oil field production and drilling equipment.

During the war, in a civilian capacity, he held several important posts in the Army Ordnance Department, designing and engineering various types of combat vehicles and their drives, including torque converter drives for tractors, tanks and self-propelled guns.

These posts included: assistant to chief engineer, Aberdeen Proving grounds, Combat Vehicle Section, Aberdeen, Md.; senior engineer, Office of Chief of Ordnance, Combat Vehicle Section at Detroit; army chief project engineer for Chrysler Engineering Laboratories, working with both development and engineering-manufacturing; at Cadillac Motor Car Corporation, supervised development of armored personnel carrier and full track truck; awarded the Bronze Star, the highest Army award a civilian can receive.

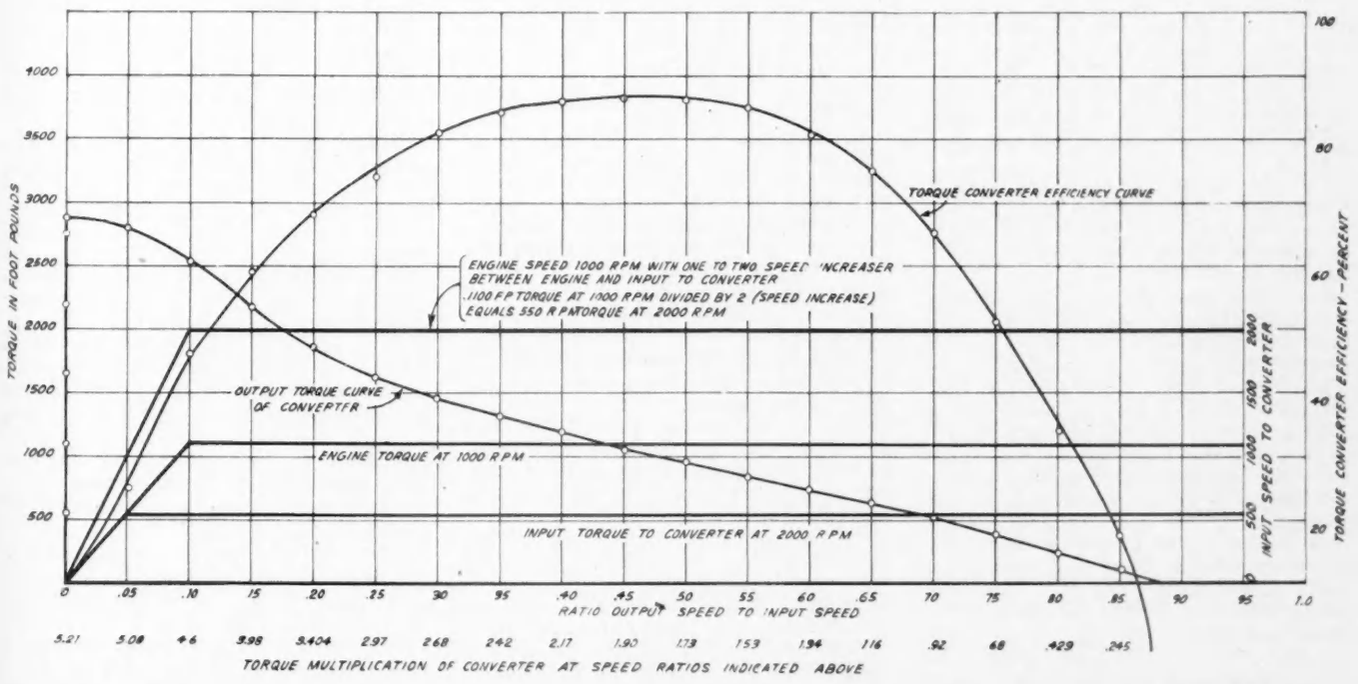

TORQUE IN FOOT POUNDS
4000
3500
3000
2500
2000
1500
1000
500
TORQUE CONVERTER EFFICIENCY CURVE
ENGINE SPEED 1000 RPM WITH ONE TO TWO SPEED INCREASER BETWEEN ENGINE AND INPUT TO CONVERTER
1100 F.P. TORQUE AT 1000 R.P.M. DIVIDED BY 2 (SPEED INCREASE) EQUALS 550 R.P. TORQUE AT 2000 R.P.M.
OUTPUT TORQUE CURVE OF CONVERTER
ENGINE TORQUE AT 1000 R.P.M.
INPUT TORQUE TO CONVERTER AT 2000 R.P.M.
100
80
60
40
20
TORQUE CONVERTER EFFICIENCY - PERCENT
2000
1500
1000
500
0
INPUT SPEED TO CONVERTER
0 .05 .10 .15 .20 .25 .30 .35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .85 .90 .95 1.0
RATIO OUTPUT SPEED TO INPUT SPEED
5.21 5.08 4.6 3.98 3.404 2.97 2.68 2.42 2.17 1.90 1.73 1.53 1.34 1.16 .92 .68 .429 .245
TORQUE MULTIPLICATION OF CONVERTER AT SPEED RATIOS INDICATED ABOVE

Figure 2. Typical torque curve of a torque converter operating under wide-open throttle condition (as differentiated from a gradual throttle advance condition).

Points on torque converter efficiency curve may be checked by taking converter output speed at any given point on torque curve as follows: To determine the torque converter efficiency at a 30 percent ratio of output to input speed, assuming engine speed to be 1000 rpm, multiply 1000 by .30, giving 300 rpm for torque multiplication of 2.68. Now assume direct-connected transmission rig driven by an engine at 1000 rpm at 2.68 gear ratio in transmission. Output speed would be 374 rpm for the direct-connected rig. Divide speed of output shaft of converter by speed of direct-connected transmission, which gives .805, the efficiency of the converter, and which also shows the horsepower loss in converting torque in a hydrokinetic torque converter.

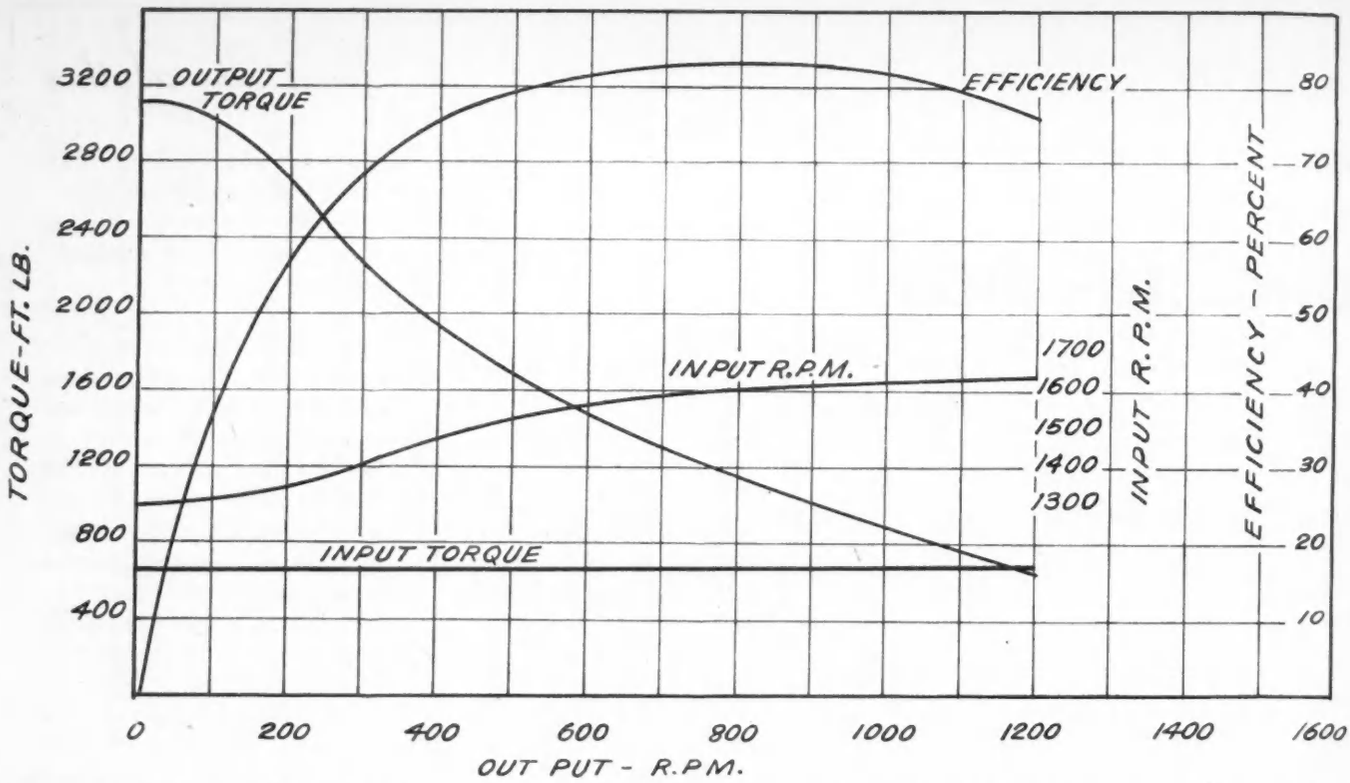


Figure 3. Manufacturers' typical theoretical torque converter curve showing how curve seldom is plotted beyond the 70-percent point on the back side of the efficiency curve. Torque multiplication factor and efficiency of torque converter falls off rapidly on back side of curve, beyond the 70-percent point.

cut off for an instant. This in turn causes the fluid to impart an added force to the turbine blades by a reaction or backward push.

The turbine blades are scientifically designed on the same principle as an airplane wing, the difference being that one is designed to operate in air and the other for operation in fluid.

The blades of the torque converter system are designed with a leading edge and trailing edge, a direction of stream, chord and an angle of attack. The angle of attack and the thickness of the leading edge are all functions in determining the displacement or lifting force of each blade.

The size of the converter, the number of blades, coupled with the design of the blades and the angle at which they are set, and the driven speed, determine the capacity of the converter.

Converter capacity increases by the square of its input speed or by the fifth power of its lineal dimensions. In some instances both factors are used.

The lifting force of the turbine blade is harnessed in a torque converter in such a manner as to produce rotary motion. As the fluid passes the vanes in the turbine member it creates a high pressure area on the front side of the blades and a low pressure area on the back side of the blades. This causes the turbine member to be moved toward the low pressure area and, in so moving, causes rotary motion to be imparted to the turbine wheel.

Operation of Converter

A torque converter is filled with a fluid having some lubricating qualities. The fluid is maintained under a pressure of 50 to 100 pounds for the purpose of suppressing cavitation (vacuum pockets) at the turbine and reaction blades. This pressure is maintained by a separate, external pump which is driven from the input shaft of the converter. A relief valve is incorporated in this pump to prevent excessive pressure from building up within the converter. Also, a fluid inlet from the cooler is provided in the throat of the centrifugal pump, which is a low pressure area, and a fluid outlet to the cooler is provided in the converter case just above the first stage turbine blades, which is a high pressure area. Located in the line between the fluid outlet and the cooler is a thermostatic valve which controls the rate of fluid flow to the cooler.

In operation, up to a speed ratio of 67.5 percent output shaft speed to input shaft speed, the converter fluid loses little velocity between the discharge of the centrifugal pump and the discharge from the last turbine stage back into the intake of the centrifugal pump. Above this 67.5 percent point the fluid velocity decreases rapidly, as will be explained later.

When the output member is at "stall," i.e., the output member is stationary, the fluid exerts all its force on the front side of all the blades. This is the point of maximum torque multiplication, such as five times engine torque. As the output member begins to pick up speed, the movement of the turbine blades through the fluid causes the fluid to be broken up. This changes the angle at which the fluid strikes the second and third series of turbine blades, causing eddy currents in the fluid. Also, this change of direction reduces the amount of force exerted against the front sides of the blades. Some of this force that was directed against the front side of the blades is now directed against the back sides of the blades, thus reducing the torque output.

This condition increases as the speed of the output member increases until the force is the same on both sides of the second and third turbine stages. Furthermore, the velocity of flow of fluid over the turbine blades decreases as the turbine picks up speed. The velocity of the fluid flow is always the difference between the rates of speed of the input and output members of the converter. The first turbine stage is then the only driving member, as there is no interference in the flow of fluid to this stage since all the force of the centrifugal pump is directed to the front side of its blades. At this point the torque is at, or approaching 1 to 1 and the output speed is 67.5 percent of the input speed.

When the output speed exceeds 67.5 percent of the input speed the output torque drops below the engine input torque. This loss is caused by the accumulation in the converter of static fluid which has no general direction and which forms an impediment to the intended flow of fluid in the converter. This forces the centrifugal pump to buck a higher head pressure, which is analogous to operating a centrifugal pump against a partially closed valve.

Furthermore, this reduction of flow through the converter also reduces the fluid head to the intake of the centrifugal pump and thus requires more power in order to pick up the fluid at this reduced head pressure.

The efficiency of the converter falls to absolute zero when the converter's output speed rises to 86 percent of its input speed. The converter's output speed never reaches its input speed, due to impedence of the flow of fluid.

The efficiency curve of the converter (Figure 2) is the same for every ratio of input speed to output speed. The torque curve is the only factor that changes for different ratios of input torque. A torque converter is an instrument for "converting," or multiplying *torque*. It cannot multiply *horsepower*

under any condition. Instead, there is an actual loss in horsepower caused by the horsepower delivered by the engine passing through the converter.

To determine the heat loss in a torque converter at every ratio of output speed to input speed it is necessary only to invert the percentage of efficiency scale, (see column of percentages on right side of Figure 2) calling zero "100" and 100 "zero." This gives the heat loss for the converter at every ratio of input speed to output speed.

The input speed, in terms of horsepower, may be multiplied by the number of Btu's per horsepower and the heat loss thus calculated for any ratio of output speed to input speed in order to determine the amount of cooling required by any torque converter under normal operation.

Efficiency Curve

The torque converter efficiency curve starts at zero efficiency and maximum torque, usually five times engine torque. As the ratio of output speed to input speed rises, the torque decreases and the efficiency of the converter increases. When the ratio of output speed to input speed rises to 30 percent, the efficiency of the converter has risen to 80 percent. This uses up the first 30 percent of the converter's range, but during this time very useful work is performed, namely the generation and application to the work of high starting torque. Also during this first 30 percent of the converter range the speed is low and therefore there is little requirement for horsepower and it is immaterial that the converter's horsepower output is less than 80 percent of its input for the few seconds it takes for the converter to rise to the 80 percent efficiency range from a standing start.

Instead of horsepower, a high starting torque is required at a standing start in order to get the load into motion as quickly as possible. After the load gets into motion the torque requirement reduces and the amount of the converter's output increases above 80 percent of its horsepower input.

In the second 30 percent of the converter range, from 30 to 60 percent ratio of output speed to input speed, the converter is operating at its ideal efficiency, 80 percent or over.

In the remaining converter range, from 60 to 86 percent ratio of output speed to input speed, the converter's efficiency drops from 80 percent to zero and the converter's torque output drops to less than engine input torque. This reduction of efficiency is brought about by a low torque requirement which allows the converter to unload and speed up.

It is therefore obvious that, in order to get the maximum efficiency out of a torque converter, it is necessary to keep it so loaded that the output torque load is always between the speed ratios of 30 to 60 percent output speed to input speed.

This can be accomplished in an oil well rig by providing and always using the proper selection of gear ratios with the converter. When this is done the drum will be driven with five times the starting torque and thereafter at the same speed and torque as is the drum in a direct-drive rig having a comparable engine.

The power loss in the converter in its ideal efficiency range of 80 percent or over is comparable to the horsepower loss in the variation of engine speed in the ordinary operation of a direct-drive rig.

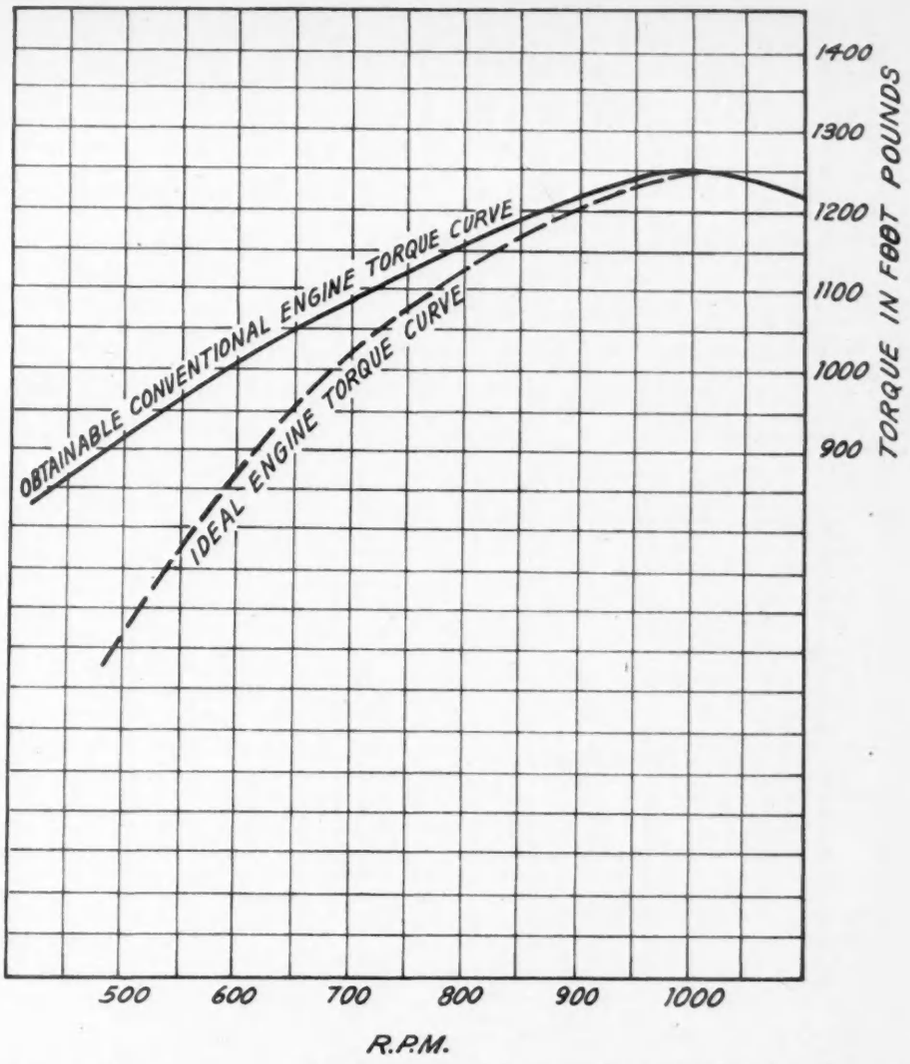


Figure 4. Engine torque curves. Solid curve is one that is readily obtainable with conventional engines, while dotted curve is the ideal engine torque curve.

In direct drive installations, the engines are loaded and pulled down to low speed by the operator selecting the highest gear ratio available that he believes the engines will pull. As soon as the engines speed up under load, a shift ordinarily is made before the next run to the next higher gear ratio in order to increase the hoisting speed. This shift cannot be made under load, but must be made *between* loads or runs. This again loads the engine and holds delivered horsepower down to a point below the delivered horsepower of the above described, ideally geared converter-driven rig which is delivering maximum torque and 80 percent or more of its received or input horsepower at all times. A torque converter, therefore, has a most ideal application in oil well rigs and similar industrial applications.

In trucks and busses, on the other hand, a converter shows a loss in comparison with a direct-connected engine drive because when it is on the open highway and the load on the engine is light, the engine is permitted to deliver full horsepower to the load and is not lugged down. The converter drive would show a power loss of over 20 percent at high speed in comparison with a direct mechanical drive, and therefore the converter drive is not as good as a direct drive for this usage except at low speed for starting. After starting, the converter should be locked out and the bus or truck should then be operated on direct connection to the transmission. This is now being done very successfully in busses.

The converter performance curve shown in Figure 2 is based on an engine torque curve which peaks its torque at 600 rpm, and is not considered an ideal engine curve for torque converters. Figure 4 illustrates ideal engine torque curves.

The engines used in direct-connected rigs must have a torque curve which peaks at low speed and then drops as the engine speed increases. The reason for this is that when the engine pulls down under load the torque will increase in order to prevent stalling of the engine, or the necessity of shifting to a lower gear. An engine of this type is usually called a good lugger, and generally is the type used on oil field installations.

If an engine were used on a direct-connected rig that had a torque curve which increased with engine speed, a slow-down of the engine would decrease the torque and the engine would stall,

TABLE 1

Tabulated data based on the engine torque curve in Figure 5, using a two to one speed increase between engine and converter in order to utilize a bus-type converter. A four-speed transmission is used.

				80 PERCENT EFFICIENCY RANGE OF CONVERTER										
Output to Input Speed Ratios	Stall –0–	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%
Torque Multiplication Factor of Torque Converter	5.21	3.404	2.97	2.68	2.42	2.17	1.90	1.73	1.53	1.34	1.16	.92	.68	.49
Engine Torque Divided by 2	550	550	550	550	550	550	550	550	550	550	550	550	550	550
Output Torque of Converter	2,865	1,872	1,634	1,474	1,331	1,193	1,045	951	841	737	638	506	374	269
Reduction between Converter and Transmission 2 to 1	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2
Input Torque to Transmission	5,731	3,744	3,268	2,948	2,662	2,387	2,090	1,903	1,683	1,474	1,276	1,012	748	538
Low Gear Transmission 4 to 1	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4	x 4
Output Torque of Transmission	22,924	14,976	13,072	11,792	10,648	9,548	8,360	7,612	6,732	5,896	5,104	4,048	2,992	2,152
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 2	x 3	x 3	x 4	x 3	x 3	x 3
Single Line Pull: Drum R=12"	68,772	44,928	39,216	35,376	31,944	28,644	25,080	22,836	20,196	17,688	15,312	12,144	8,976	6,456
Drum Speed, RPM	0	16	20.6	25	29.2	33.3	37	41	45.6	50	54	58	62	66
SECOND GEAR:														
Input Torque to Transmission	5,731	3,744	3,268	2,948	2,662	2,387	2,090	1,903	1,683	1,474	1,276	1,012	748	538
Second Gear Transmission 2 to 1	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2	x 2
Output Torque of Transmission	11,462	7,488	6,536	5,896	5,324	4,774	4,180	3,806	3,366	2,948	2,552	2,024	1,496	1,076
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Single Line Pull: Drum R=12"	34,386	22,468	19,608	17,688	15,792	14,322	12,540	11,418	10,098	8,844	7,656	6,072	4,488	3,228
Drum Speed RPM	0	32	41.2	50	58.4	66.6	74	82	91.2	100	108	116	124	132
THIRD GEAR:														
Input Torque to Transmission	5,731	3,744	3,268	2,948	2,662	2,387	2,090	1,903	1,683	1,474	1,276	1,012	748	538
Third Gear Transmission 1 to 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1
Output Torque of Transmission	5,731	3,744	3,268	2,948	2,662	2,387	2,090	1,903	1,683	1,474	1,276	1,012	748	538
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Single Line Pull: Drum R=12"	17,193	11,232	9,804	8,844	7,986	7,161	6,270	5,709	5,049	4,222	3,828	3,036	2,244	1,614
Drum Speed, RPM	0	64	82.4	100	116.8	133.2	148	164	182.4	200	216	232	248	264
HIGH GEAR:														
Input Torque to Transmission	5,731	3,744	3,268	2,948	2,662	2,387	2,090	1,903	1,683	1,474	1,276	1,012	748	538
High Gear Transmission 1 to 2 (over-drive)	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5	x .5
Output Torque of Transmission	2,865	1,872	1,634	1,474	1,331	1,193	1,045	951	841	737	638	506	374	269
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Single Line Pull: Drum R=12"	8,596	5,616	4,902	4,422	3,993	3,579	3,125	2,853	2,523	2,211	1,914	1,518	1,122	807
Drum Speed, RPM	0	128	164.8	200	233.6	266.4	296	328	364.8	400	432	464	496	5,428

TABLE 2

Tabulated data based on the engine torque curve in Figure 5, but with the engine driving now directly into a transmission with 24 gear ratios having a spacing of 0.5 between each speed.

Transmission Ratios	12 to 1	11.5 to 1	11 to 1	10.5 to 1	10 to 1	9.5 to 1	9 to 1	8.5 to 1	8 to 1	7.5 to 1	7 to 1	6.5 to 1
Engine Torque at 1000 RPM	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
Reduction in Transmission	x 12	x 11.5	x 11	x 10.5	x 10	x 9.5	x 9	x 8.5	x 8	x 7.5	x 7	x 6.5
Output Torque of Transmission	13,200	12,650	12,100	11,550	11,000	10,450	9,900	9,350	8,800	8,250	7,700	7,150
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Line Pull: Drum R=12"	39,600	37,950	36,300	34,650	33,000	31,350	29,700	28,050	26,400	24,750	23,100	21,450
Drum Speed, RPM	27.7	29	30.3	31.7	33.3	35	37	39	41.6	44	47	51
Engine Torque at 800 RPM	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Reduction in Transmission	x 12	x 11.5	x 11	x 10.5	x 10	x 9.5	x 9	x 8.5	x 8	x 7.5	x 7	x 6.5
Output Torque of Transmission	14,400	13,800	13,200	12,600	12,000	11,400	10,800	10,200	9,600	9,000	8,400	7,800
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Line Pull: Drum R=12"	43,200	41,400	39,600	37,800	36,000	34,200	32,400	30,600	28,800	27,000	25,200	23,400
Drum Speed, RPM	22	23	24	25.4	26.6	28	29	31	33	35	38	41
Engine Torque at 600 RPM	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Reduction in Transmission	x 12	x 11.5	x 11	x 10.5	x 10	x 9.5	x 9	x 8.5	x 8	x 7.5	x 7	x 6.5
Output Torque of Transmission	15,600	14,950	14,300	13,650	13,000	12,350	11,700	11,050	10,400	9,750	9,100	8,450
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Line Pull: Drum R=12"	46,800	44,850	42,900	40,950	39,000	37,050	35,100	33,150	31,200	29,250	27,300	25,350
Drum Speed, RPM	16.6	17.4	18	19	20	21	22.2	23.5	25	26.6	28.5	30.7

Transmission Ratios	6 to 1	5.5 to 1	5 to 1	4.5 to 1	4 to 1	3.5 to 1	3 to 1	2.5 to 1	2 to 1	1.5 to 1	1 to 1	.5 to 1
Engine Torque at 1000 RPM	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
Reduction in Transmission	x 6	x 5.5	x 5	x 4.5	x 4	x 3.5	x 3	x 2.5	x 2	x 1.5	x 1.0	x 0.5
Output Torque of Transmission	6,600	6,050	5,500	4,950	4,400	3,850	3,300	2,750	2,200	1,650	1,100	550
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	-3	x 3	x 3
Line Pull: Drum R=12"	19,800	18,150	16,500	14,850	13,200	11,550	9,900	8,250	6,600	4,950	3,300	1,650
Drum Speed, RPM	55	60	66	73	83	95	111	133	166	222	333	666
Engine Torque at 800 RPM	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Reduction in Transmission	x 6	x 5.5	x 5	x 4.5	x 4	x 3.5	x 3	x 2.5	x 2	x 1.5	x 1.0	x 0.5
Output Torque of Transmission	7,200	6,600	6,000	5,400	4,800	4,200	3,600	3,000	2,400	1,800	1,200	600
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Line Pull: Drum R=12"	21,600	19,800	18,000	16,200	14,400	12,600	10,800	9,000	7,200	5,400	3,600	1,800
Drum Speed, RPM	44	48	53	59	66	76	88	106	133	177	266	532
Engine Torque at 600, RPM	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Reduction in Transmission	x 6	x 5.5	x 5	x 4.5	x 4	x 3.5	x 3	x 2.5	x 2	x 1.5	x 1	x 0.5
Output Torque of Transmission	7,800	7,150	6,500	5,850	5,200	4,550	3,900	3,250	2,600	1,950	1,300	650
Reduction to Drum 3 to 1	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3	x 3
Line Pull: Drum R=12"	23,400	21,450	19,500	17,550	15,600	13,650	11,700	9,750	7,800	5,850	3,900	1,950
Drum Speed, RPM	33	35	40	44	50	57	66	80	100	133	200	400

or a shift to a lower gear would have to be made in order to maintain torque.

Where a converter is used in the power train, the converter output shaft does the necessary fluctuating and increases the torque at a greater rate and with a smaller speed change without affecting the engine speed or its output torque. The converter slips, but in slipping it also multiplies torque.

Match Engine and Converter Curves

It is well known that the torque capacity of a torque converter increases with the input speed. If the above described, conventional oil field engine with a torque curve which peaks its torque at low speed and reduces its torque at higher speed is used with a converter, more torque is delivered to the converter than it is capable of handling at low speed, and less torque is delivered to the converter at high speed than the converter is capable of handling. Therefore, to get maximum torque and speed from a torque converter, the engine torque curve should match as closely as possible the torque capacity of the converter at all engine input speeds to the converter. See torque curve, Figure 5.

Many engine manufacturers now have alternative cylinder heads, cam shafts and manifolds (such as those used for marine work) which produce a torque curve that increases progressively with engine speed. These are interchangeable with the cylinder heads, cam shafts and manifolds on their regular standard industrial engines. Some manufacturers, for example, will furnish either type heads, cams and manifolds optionally, at no additional cost to the customer.

Most torque converter curves in existence today are calculated theoretically and are not the result of actual dynamometer stand tests under actual oil field conditions. These calculated torque curves are based on a theoretical gradual throttle advance, which is impractical or impossible in the oil fields where the operator usually pulls the engine throttle wide open and awaits results.

The gradual throttle advance in these theoretical torque curves is used in order to try to match the engine input torque to the converter capacity at each speed. It also has the further effect of artificially holding up the efficiency curve of the converter by increasing the pump speed in relation to the turbine speed. This also gives a flatter torque curve—as well as efficiency curve—than actual oil field operation gives. Furthermore, the manufacturer's theoretical torque converter curves are never plotted beyond 70 percent efficiency on the back side of the curve (as shown in Figure 3) and hence these theoretical curves do not give the true picture of converter performance in actual use. For these reasons the theoretically calculated curve, as above described, does not give the manufacturer of drilling rigs or hoists the information he needs in order to design his power train for maximum horsepower output and maximum torque output under actual oil field use conditions.

Matching a torque converter to an engine which peaks its torque at low speed and reduces its output torque at high speed usually is a compromise and fails to produce the full horsepower and torque which could be delivered by a properly designed engine for a torque converter installation. With a properly designed engine torque curve, as described elsewhere in the article, where the torque increases with engine speed, there would be no need for a gradual throttle advance in order to produce a synthetic, theoretical curve, as the capacity of the converter would match the engine torque curve at every engine speed.

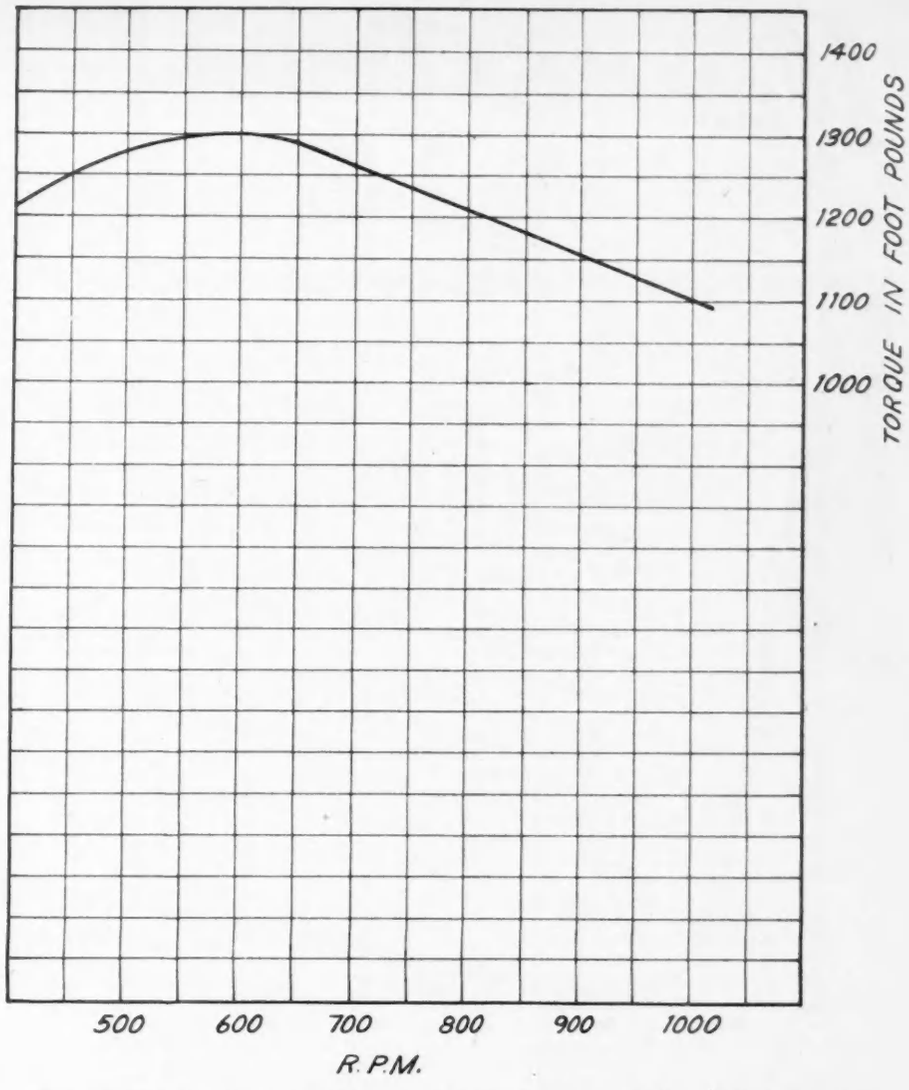


Figure 5. Typical conventional engine torque curve presently available on industrial engines.

Horsepower Loss Measure

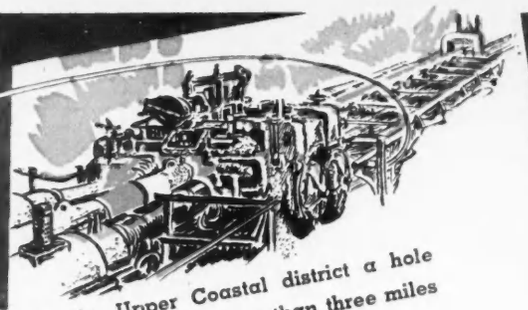
The efficiency curve of the converter is in reality the measure of the converter's horsepower loss, as shown by the percentage of the amount of horsepower put into the converter by the engine as compared with that which is actually put out or delivered by the converter to the work. For this reason all oil men should be intensely interested in the efficency curve of a torque converter, even though, otherwise, they ordinarily might not be interested in "efficiences," "curves" and similar statistics. Of necessity, operators must be interested in the amount of horsepower loss which must be "paid for" in order to secure the added advantages of a converter as compared with a direct drive.

Torque-converter blading can be designed to give nearly every kind of desired torque curve and efficiency curve within reasonable limits. The most desirable torque curve is one which develops 2.68 times engine torque at 30 percent ratio of output speed to input speed and 1.34 times engine torque at 60 percent ratio of output speed to input speed. The most desirable efficiency curve is one which rises to 80 percent efficiency at a ratio of 30 percent output to input speed and which leaves the 80 percent efficiency range at a ratio of 60 percent output speed to input speed. This curve gives a two-to-one speed increase and two-to-one torque decrease within the 80 percent efficiency range. Also, this simplifies the gearing of the power train by permitting compounding of the gears.

With present torque converter installations it is difficult, if not impossible, to match to a fixed size of converter, different engines of the same horsepower and speed which peak their torques over a wide range of speeds. Such installations deliver less power from the converter, as all factors constitute a compromise. A rising torque and horsepower engine curve would greatly simplify torque converter blading problems and would vastly improve the performance of the entire rig.

As torque converters gain acceptance in the oil fields, engine manufacturers that cater to the oil field trade undoubtedly will provide engines adapted

Youngstown to the TEXAS GULF COAST

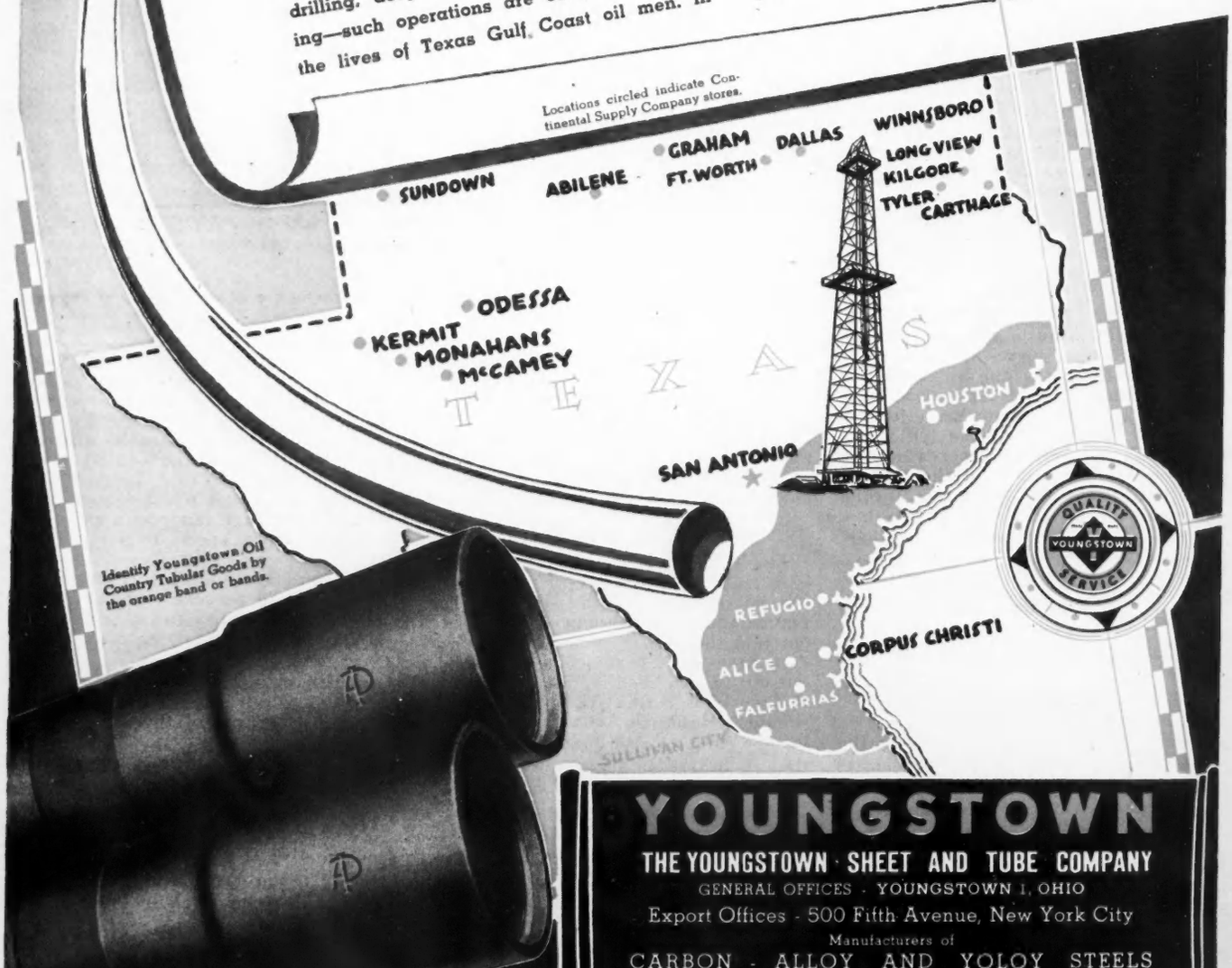


No region in North America is richer in oil than the Gulf Coast of Texas. There in a broad belt stretching from the Sabine to the Rio Grande, out in the waters of the Gulf itself and over a hundred miles inland, oil men produce nearly a fifth of the country's crude. There, too, is stored an even larger portion of the nation's proven reserves.

To produce this oil calls for unusual ingenuity, hard work, perseverance and high grade equipment in overcoming almost every difficult condition known to oil men. Barge drilling, deep drilling, high pressure drilling—such operations are common-place in the lives of Texas Gulf Coast oil men. In 1945, in the Upper Coastal district a hole was drilled at 815 feet more than three miles down—deepest hole in Texas.

When the pioneers struck oil at Spindletop in 1901, Youngstown was just a year old. Throughout the oil history of this great region, Youngstown has supplied a large share of the oil country tubular goods. Operators in the several districts comprising this coastal area have found that Youngstown drill pipe, casing, tubing and line pipe is suitable for their toughest drilling, production and transportation requirements. Here, as in every other field, the orange bands on pipe are recognized as the sign of quality and dependability.

Locations circled indicate Continental Supply Company stores.



Identify Youngstown Oil Country Tubular Goods by the orange band or bands.

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Drawn Carbon Steel Rounds-Tie Plates and Spikes.

to converter installations, as above described, both slow speed and high speed engines.

Gearing

Provision of a torque converter in the power train will not eliminate the necessity for a transmission. A torque converter merely reduces the number of gears required from 12 to four, thus cutting to one-third the number of gears required in a direct-driven rig to attain comparable results.

The torque converted rig provides the added advantage of the high starting torque which is not possible with a direct drive, mechanical rig.

Not only does the torque converter eliminate two-thirds of the gears required, but it also vastly improves the performance of the gears actually used, by bridging the steps of the gears, and by delivering automatically the maximum torque and speed for each speed range of the transmission.

It is well known that the starting torque required at the start of hoisting a string of pipe is approximately 30 percent greater than the torque required for the normal hoisting load. In a direct-connected rig, in order to start the load, the engines ordinarily are opened up to high speed, and the clutches engaged at the highest speed ratio in the transmission which the driller believes the engines will stand. This is done in order to make the best possible time coming out of the hole.

By engaging the clutches at high speed, advantage is taken of the kinetic energy of the engine and all of the moving parts, in order to actuate the load from a standing start. This throws a terrific overload and shock load on the drive and on its chain and clutches, abuses the engines and shortens their lives. It also materially increases shutdown time and maintenance cost of the entire rig. The manifold pressure of the engines is pulled down and there is a wide range of engine speed fluctuation, none of which is conducive to long engine life.

Equipment Life Lengthened

On the other hand, with a torque converter, at stall, the output torque is five times the engine output torque. If the power train is designed to operate at the peak efficiency range the available starting torque will be over 60 percent greater than that required for further hoisting after the load is once under way. On starting the load the engine is already up to speed, and as fast as the load gets under motion the converter output shaft increases speed as the torque load decreases. The manifold pressure of the engine is held relatively constant, delivering maximum horsepower and torque at all times and providing a fluid cushion which relieves all parts from sudden shock loading.

It has been found in actual practice that, where torque converters are used, the life of clutches, chains and engines has been increased, maintenance cost and shutdown time have been decreased, the capacity of the rigs has been greatly increased and the pulling time has been decreased over the conventional mechanically driven gas engine rig.

A typical engine torque curve currently in use is shown in Figure 5. This curve is not an ideal one for torque converter use. It peaks its torque at 600 rpm and at this speed the engine torque is 1300 foot pounds. At 800 rpm the engine torque is 1200 foot pounds, and at 1000 rpm, which is maximum operating speed of the engine, the torque is 1100 foot pounds.

Tables 1 and 2 compare a torque converter driven rig and a direct-connected rig. Both are based on engine data contained in the typical engine torque curve illustrated in Figure 5. Table 1 shows the performance of a torque converter drive having four speeds in the transmission and one speed to the drum, with the above engine driving into the converter at constant speed. Between the engine and converter is a two-to-one speed increaser which permits the use of a small high-speed converter. Between the output shaft of the converter and the input shaft of the four-speed transmission is a two-to-one reduction which brings the speed and torque back to what it would have been if the engine had driven direct into a low speed converter. Either type of drive may be used without affecting the input torque and speed into the transmission. The speed ratios in the transmission are four-to-one low, two-to-one second, one-to-one third, and one-to-two (over-drive) high. The reduction to the drum is three-to-one. The torque multiplication factors of the converter are taken from Figure 3.

Table 2 is based on the same engine that drove the torque converter, but driving now directly into a transmission with 24 gear ratios with a spacing of 0.5, between each speed. The reduction to the drum is three-to-one, the same as in the torque converter driven rig. Taking 800 rpm as the average operating speed of the engine under load, a comparison can be made between the converter drive and the direct drive. No allowance has been made in the converter drive charts for the high starting torque of the converter drive which will bring the load up to speed much quicker than a direct-driven rig.

As a matter of interest, if the reader will multiply the speed ratios in his present rig with say six speeds by the torques shown in Figure 5 and compare the result with Table 1, it will show the very obvious advantages to be gained by using a torque converter drive.

In the table, speed ranges of the torque converter were worked out at stall, and through a speed range of from 20 percent to 80 percent ratio of output speed to input speed. At 20 percent ratio of output speed to input speed the efficiency of the converter is 68 percent, and at the speed ratio of 70 percent output speed to input speed, the efficiency is 65 percent. From 30 percent to 60 percent ratio of output speed to input speed the efficiency, or percentage of delivered horsepower, is 80 percent or over. This 80 percent efficiency range is very important in the building of the power train to obtain maximum efficiency, i.e., horsepower and speed.

By referring back to Figure 2, the performance curve of the torque converter, it is seen that at 30 percent ratio of output speed to input speed, the point where the converter reaches the 80 percent efficiency range, the torque curve shows 2.68 times engine torque, and at 60 percent ratio of output speed to input speed, the point where the converter begins to leave the 80 percent efficiency range, the torque curve shows 1.34 times engine torque. This represents a speed increase of the output shaft of the converter of two-to-one, and a torque decrease of two-to-one all within the 80 percent efficiency range. Therefore, if the transmission were in low gear (four-to-one) and the converter output speed at 60 percent ratio of output speed to input speed, and a shift was made from low (four-to-one) to second (two-to-one) the torque load on the converter would be doubled and the converter output shaft would slow down to 30 percent ratio of output speed to input speed, which is half the speed and twice the torque on the output shaft of the converter that existed before the shift was made. The reduction in the transmission after the shift is two-to-one instead of four-to-one; the torque output of the converted is twice and the speed is half that which existed before the shift was made.

This produces the same torque and speed on the drum after the shift was made as before it was made. This also happens when a shift is made from two-to-one, to one-to-one and from one-to-one, to one-to-two over-drive. If the gears are automatically shifted there is no overlap of torques and speed in the 80 percent efficiency range, and the highest torque and speed range of the converter in its peak horsepower range is possible at all times for every engine input speed under every load condition.

Speed Ratios

Four speed ratios are worked out for the torque converter performance (Table 1), namely, four-to-one low, two-to-one second, one-to-one third, and one-to-two (over-drive) high, together with a three-to-one reduction between the output shaft of the transmission and the drum. The table shows that at 70 percent ratio of output speed to input speed in low gear there is 12,144 foot pounds torque on the drum with 58 rpm. If a shift is made to second gear, at 45 percent ratio of output speed to input speed in second gear, there is 12,540 foot pounds of torque with 74 rpm. However, the torque is less than 12,540 foot pounds, and the speed of the load will fall between 45 percent and 50 percent ratio of output speed to input speed, which will give a drum speed of 78 rpm. The speed at 70 percent ratio of output to input speed was 58 rpm which represents a speed increase of 20 rpm on the drum for the same torque load. This is one of the differences between operating on the 80 percent efficiency part of the curve instead of on the 65 percent efficiency part of the curve.

In all instances of speed ratios not found in the 80 percent efficiency range of the converter, namely from 30 percent up to 60 percent ratio of output to input speed, a speed ratio can be found in low, second, third or high in the 80 percent efficiency range which will be at a higher speed for the same torque load.

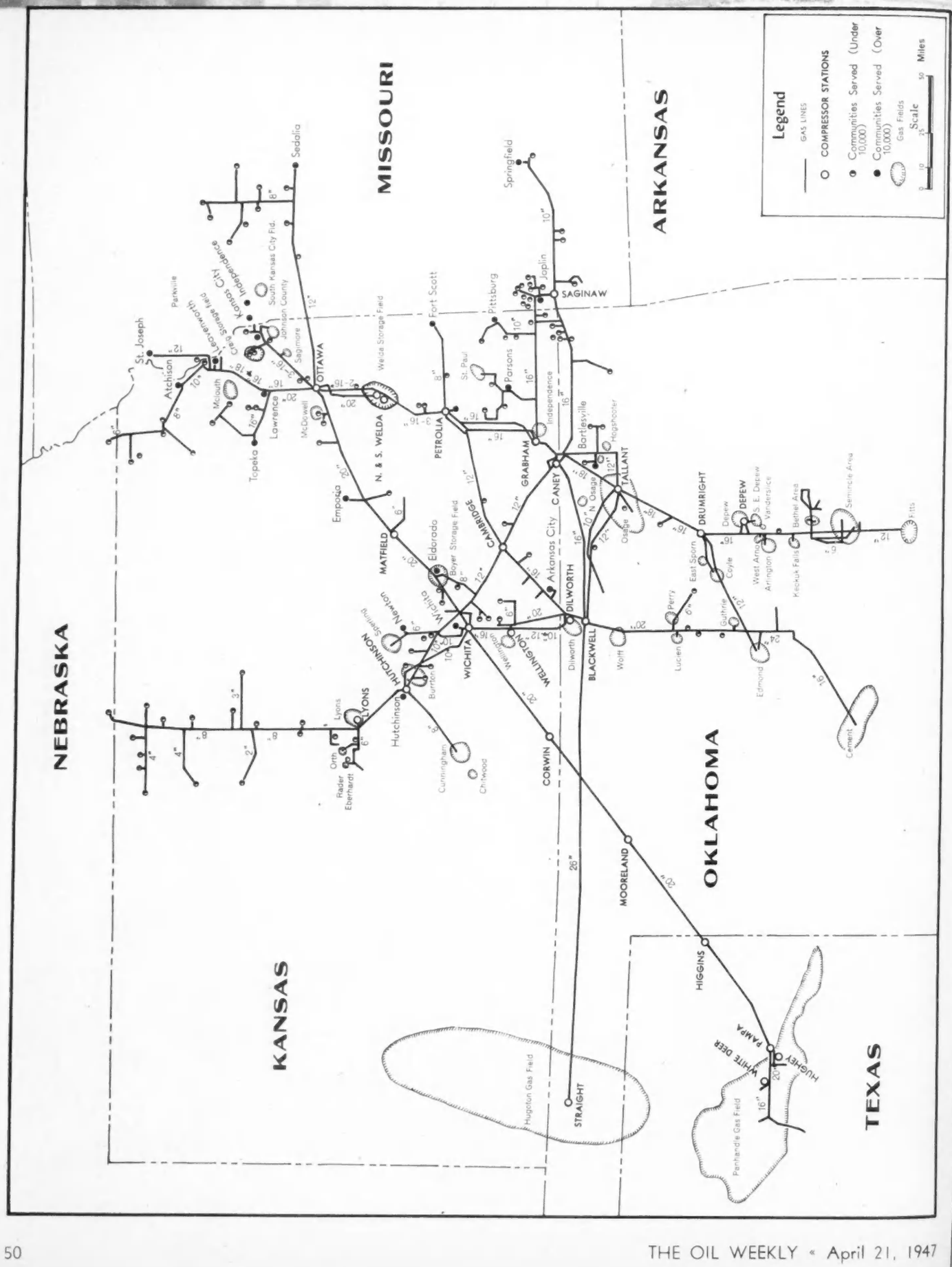
It will be noted in the speed and torque table for the converter that there is no lap in speed or torque for a properly selected four speed transmission in the 80 percent efficiency range of the converter and a properly designed converter and engine torque curve.

[To Be Concluded]

Pipe Lines of the U. S.

Cities Service Gas Company

11th of a Series



The Natural Gas Act

And the Oil and Gas Producer

OIL and gas producers and the industry cannot but remember that the Federal Power Commission called and scheduled its natural gas investigation during the war when every oil and gas producer was exclusively engaged and bending every effort to save the life of the nation. Neither will we forget the reply the Federal Power Commission made to the Petroleum Industry War Council in July of 1945 when its chairman, William R. Boyd, asked the purpose and intention of the natural gas investigation.

In those desperate days, the lame excuse was given that the commission's only desire was "a complete and current picture of the entire industry." The explanation was obviously unsatisfactory. All of us then were vaguely aware of the recommendation and effort to declare "the petroleum and natural gas industries public utilities" in order to subject drilling, proration, and production to national control. The chairman of the Federal Power Commission had then proclaimed that the imposition of public utility status on the oil and gas producer was no longer doubtful and that such regulation was peculiarly necessary. It may be said, however, that in 1945 few, if any, of us knew and understood just how this national economic program could be accomplished since there was no law authorizing it and the Congress had expressly prohibited the Federal Power Commission from exercising any jurisdiction over production and gathering.

Extension of Jurisdiction Without Judicial Review

The year 1946 revealed the legal subtleties and devices employed by the Federal Power Commission in its calculated program to secure control of the natural gas producing and gathering business and natural gas producing properties. The undisclosed pattern was a simple one. Having freed itself from effective judicial review, the commission exploited, both horizontally and vertically, its restricted and limited powers. Its granted power and jurisdiction over transportation of gas in interstate commerce and sales for resale after transportation were enlarged and extended, while its prohibited jurisdiction with respect to production and gathering was narrowed and restricted. "Producing and gathering" were so diminished in meaning as to signify only the management of drilling rigs, pumps, pipes, and flow tanks, whereas jurisdictional transportation was enlarged to include both transmission and gathering of gas. The jurisdiction over gas sales after interstate transportation was widened so as to include the producer's sale as well as the gatherer's sale. The commission, forbidden to directly control and regulate production and gathering, entered into a program of doing indirectly that which Congress denied to it directly. Its powers to prescribe uniform accounts and to fix rates were employed designedly to do indirectly that which Congress had forbidden. It deliberately chose and selected an administrative device for regulating jurisdictional rates which would have the indirect effect of controlling production and gathering as well as the field price of gas. It was a happy selection because it furnished a basis on which to predicate the valuation of oil- and gas-producing leases and the restriction of earnings thereon of both the pipe line and non-pipe line producer. Its power of investigation was exaggerated and magnified to cover a number of topics which were "obviously matters of state and local concern," over which the commission had no semblance of jurisdiction. Its certificate and rate making powers were expanded to an astronomical degree. Its powers were so enlarged as to give support to future orders of the commission designed to limit and suppress gas production which might be considered unsocial, uneconomic, or politically unwise, and this notwithstanding contrary views of "conservation efforts and accomplishments of the state."

The exercise of such claimed jurisdiction meant nothing more or less than national control and regulation of the oil and gas industry. The commission's staff informs us this month that the exercise of at least one of these powers "would be to establish federal authority over all field and well prices for natural gas. Control of oil as well as gas would necessarily become involved since the production of thees two resources is to a large extent inseparable." The report further says that it would be impractical for the federal government to exercise such a power "unless it also took over from the states essential functions now performed by them relative to oil and gas conservation and the protection of correlative property rights in these resources."

Unless, therefore, the asserted powers and jurisdiction of the Federal Power Commission are restricted and limited as was originally intended by Congress, we have the accomplished fact of federal control. And more than that, we have control of the oil and gas industry by a national bureau whose power is limited to the regulation of interstate transmission of gas and sale thereof after such transportation.

The Remedy

The focus of the Natural Gas Act is pointed directly on one easily defined type of interstate transportation of gas and the sale thereof by the transporter. This alone is within the legitimate orbit of the intended legislation. Specious interpretation, administration, and ill-considered adjudication have so distorted the congressional purpose and intent that nothing short of congressional action can eliminate the perversion. The act now can be restored to its original proportions and purposes only by the authority that created it—the Congress of the United States. Should the commission disclaim its exaggerated ideas of power and jurisdiction, and should it abandon its notion that this special legislation is the breeding ground for countless implied powers, its emaciated form would nevertheless always harbor dire threats to the oil and gas industry. The industry has made it plain that it only expects and desires the act to be restored to its original proportions and purposes. There is no effort to destroy, change, or add new provisions to the law. It was at the time enacted and is now needed and beneficial legislation. The Rizley and Moore bills, now pending in Congress, will restore the act to the original intent and purpose of the Congress and nothing more.

The report made by the commission's staff during the present month employs 44 pages to explain the "shall not" clause of the Natural Gas Act immunizing production and gathering from commission regulation. In despair, the staff concludes that the Congress is incompetent to definitely and practically define jurisdictional transportation so as to exclude non-jurisdictional gathering. Hence; the commission's jurisdiction in this respect should be left flexible so that the commission, and not the Congress, may define its own jurisdiction by means of administrative findings in particular cases.

This is not the American way. It has been our ancient custom to set down and enumerate in writing the powers of

By WALACE HAWKINS
Vice President and General Counsel, Magnolia Petroleum Company, Dallas

Presented at the Spring meeting of the Southwestern District API Division of Production, Fort Worth, March 27-28, 1947.

our rulers. Flexible or accordion power and jurisdiction, which expand or contract at the wish, whim, or consent of a governmental agency, are certainly unknown to our system. We can never suppress usurpations if we authorize our rulers to fix their own powers. Moreover, most of us would not be so pessimistic as to the ability of our Congress. In the past our legislators have found little difficulty in defining such things as forgery, embezzlement, murder, and a list of crimes and abstractions which have made our government one of law. Surely production, gathering, and transportation, common terms even to the unlearned, are susceptible to easy definition in a practical way. At least they may be defined so that an oil and gas producer may predict when his earnings will or will not be limited to 6½ percent. The definitions in the Rizley and Moore bills are not hard to read or understand.

Another conclusion of the staff in its report to the commission seems to be that the "shall not" production and gathering clause immunizes from commission regulation some producers and gatherers but not others. Congress excluded from commission regulation "production and gathering" without regard to whom the producer or gatherer was. The exemption from regulation was complete, absolute, and general, without reference to whether the producer owned or did not own a pipe line. The exemption was couched in terms of the business of producing and gathering, and not in terms of who did the producing and gathering. This conclusion of the staff but illustrates the usual technique whereby the granted power is dissected into microscopic categories and magnified so that the one overlaps or conflicts with the other, creating unnecessary issues of interpretation, confusion, and distortion of the act. This mental autointoxication, we submit, is not merely fortuitous.

The most belabored conclusion announced by the staff and boldly confessed is that some sales of gas made by a certain class of producers and gatherers are not subject to commission regulation. Congress had mentioned but one sale—that made by a transporter after interstate transportation. It would be enough to say, in answer, that other employees of the commission handling pending litigation hold and have held a different and contrary view. It is recommended that the commission disclaim, by an administrative order, power to fix the price of some sales of certain producers. Industry is invited to consent. This partial remedy is inadequate and ineffective. As heretofore observed, subject-matter jurisdiction is not amenable to expansion or subtraction by mere declaration of a governmental agency and the consent of the governed. By agreeing to this suggestion, industry would concede that the commission had some power over sales of gas other than the sales of gas by a transporter after completion of interstate transportation. This cannot be done. We can only repeat, with respect to this suggestion and recommendation of the staff, the remarks made by the Supreme Court concerning another national agency: "If we are obliged to depend upon administrative interpretation for light in finding the meaning of the statute, the inconsistency of the board's decision would leave us in the dark."

It would be appropriate and beneficial here, however, to appraise the scope, proportions and effect of the recommendation of the staff that the sales of some producers be declared free and immune from commission regulation. In plain English, the recommendation simply means the commission is willing to disclaim implied and indirect power to fix the field price of 20 percent of the gas entering transmission lines to be transported to interstate destination. For in fact 80 percent of the total gas transported in 1944 was transported by natural gas companies subject to commission jurisdiction. It is unnecessary to say that governmental power to fix the price of 80 percent is equivalent to the practical power to control 100 percent of the gas entering interstate commerce. The report concedes nothing.

The recommendations and suggestions of the staff fail miserably to restore the Natural Gas Act to its original scope and purpose. The suggestions of the staff report apply only to minutia. It fails to reach the substance and merits of the matter at hand. Nowhere does the staff report suggest abandonment of its control of production and gathering by indirect methods and devices. The concession made is so small that its practical effect upon the present administration of the act by the commission is negligible. It must be said in fairness, however, that the report does obliquely point out that which has been very obvious—the broad public interest with respect to natural gas is not likely to be furthered by the Federal Power Commission's administration of the Natural Gas Act for the exclusive benefit of consumers and investors in pipe lines, unmindful of the effect of its action upon oil and gas producers.

Oil and gas producers, as well as consumers, state regulatory bodies, and state sovereigns, must look for a remedy to the Congress of the United States. The Natural Gas Act should be restored to its original meaning and given a fair trial. State regulation of production, gathering, and distribution, supplemented by national regulation of interstate transportation and sale after such transportation, was and is the accepted American system of regulation. The Congress did not intend to nationalize regulation of the oil and gas business. The Natural Gas Act should not be used as a vehicle for accomplishing such an unauthorized objective. The federal and state system of industry regulation is practical and workable. Such a system offers adequate and ample consideration and protection of the varied interests at stake. It should be resumed at once.

Anti-Federal Power Commission Activities

The five staff reports to the Federal Power Commission, containing 342 pages, once announced as not being available until at the close of this session of Congress, are now catapulted on the industry. Congressional activity concerning the amendment of the Natural Gas Act accounts for this burst of speed. These reports are complete and satisfactory evidence that the Federal Power Commission does not have that disinterestedness in the matter of its jurisdiction which industry is entitled to expect. Rather oil and gas producers are compelled to consider and treat the commission as an advocate in the matter of legislation affecting its jurisdiction and power. The commission, among other things, apparently opposes any attempt by the Congress to define its jurisdiction in a practical manner. This is regrettable. Oil and gas producers subject to the power of the commission are opposed to such views. The question naturally arises with respect to the expression and advocacy of views and opinions contrary to those advocated by the commission. Naturally, oil and gas producers would not knowingly invite retaliation. Many oil and gas producers say they cannot afford to incur the disfavor of the commission and its staff. Many are remaining silent because of such fears. It is true that oil and gas producers do not have a ready, adequate, or effective defense against retaliatory activities of the commission, a governmental agency which controls their business affairs with a free hand. There is no law to prevent retaliation against a member of the industry because he "has filed charges or given testimony" against the commission.

The Supreme Court has so immunized the activities of the commission that an oil and gas producer who may suffer a retaliatory order of the commission is without any effective remedy in the courts.

In all candor, we could hardly be expected to feel secure in telling Congress our views in mere reliance on the benign fairness of an aggressive opponent fired with a zeal for social and governmental reform. The best we may do is to watchfully expect no activities smacking of reprisals or coercion. For future protection, the Natural Gas Act should contain a clause protecting those who give testimony in opposition to the theories and policies of the commission.

Montana Oil-Gas Laws Outlined to RMOGA Group

Legislative action to give Montana an adequate oil and gas conservation law was outlined by Governor Sam C. Ford at the quarterly directors' meeting of the Rocky Mountain Oil and Gas Association held at Billings, Mont., April 10-11.

Governor Ford was optimistic as to further oil and gas development in Montana, and mentioned the state government's desire to aid and encourage industry's successful development of additional oil reserves.

Responses to the governor's address were made by E. J. Sullivan of Casper, Wyoming, and O. C. Schorp of Tulsa, president, Cater Oil Company.

Full discussions were had on reports of various standing subcommittees during the business sessions and all reports were approved by the board of directors.

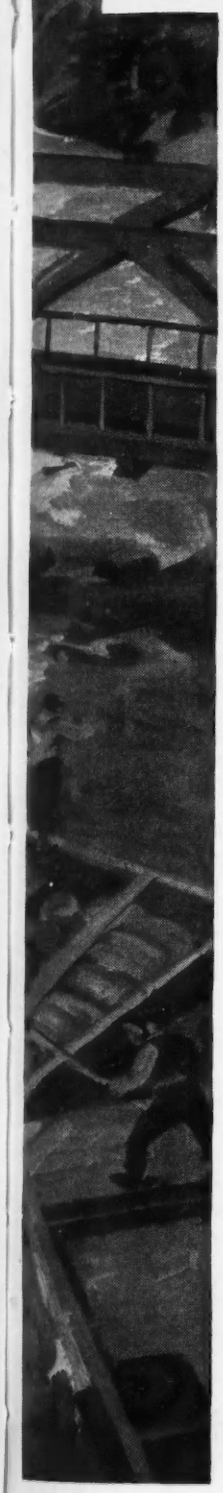
James Donoghue of Denver, president of the association, presided at the meeting which was attended by about 100.

Unitization Bill Requires Royalty Owners' Approval

The Oklahoma Senate has passed a bill requiring consent of at least 50 percent of the royalty owners before an oil field can be unitized. The bill, opposed by Governor Roy J. Turner, has been sent to the House of Representatives.

The bill was defeated in the Senate, then revived on a motion to reconsider. If approved by the house, there was a possibility that the governor might veto the measure.

LAYING STEEL PIPE LINE



TRANSPORT OF PETROLEUM TO SERVE YOU WOULD BE WASTEFUL, SLOW, COSTLY—WITHOUT STEEL

Without steel, the petroleum that serves you in so many ways would still come out of the fields in wooden barrels. Transport would depend upon wagons, or flatcars with big wooden tubs. It might have to resort again to artificial floods, such as were operated during the "Oil Excitement" in Pennsylvania to sweep loaded flatboats down Oil Creek into the Allegheny and on to Pittsburgh. Lives were lost, great quantities of priceless petroleum were wasted when flimsy craft were wrecked in this frenzied rush to markets.

With steel, petroleum and its products and natural gas are transported to distant markets swiftly, inexpensively and without waste in pipe line systems that criss-cross the country. Thousands of miles of them are line pipe manufactured by Jones & Laughlin Steel Corporation of Controlled Quality Steel. Other J&L steels are components of tank cars and trucks, tank ships and barges.

Tomorrow, steel and petroleum research will develop still stronger, tougher steels. With these the oil and gas industries will achieve still better transportation for their many products so vitally essential to our mechanized civilization.

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PIPE LINES

"Without the pipe line," says the story of 85 years of the oil business published in 1944 by the American Petroleum Institute, "oil literally would have backed up into the wells for lack of outlet, and the needs of modern civilization been left unsatisfied."

5 million barrels of crude oil are handled every day by pipe line systems in U. S.

A pipe line pousse-café is development of petroleum research, whereby 14 different petroleum products today may be transported at same time in same pipe line without mixing, as in making a pousse-café, gay 90's colorful tipple of liqueurs in layers of different specific gravities.

1st successful pipe line was laid in 1862 by Barrows & Co. to transport oil from Tarr Farm (Oil Creek) to nearby refinery.

"Pond freshets," (artificial floods) were operated in Oil Creek, before pipe lines were laid, to float boats to market loaded with oil in barrels and in bulk. Sawmill dams were opened, often twice a week, causing a quick rise in the stream. Waiting boatmen then cast off and went whirling down Oil Creek in their frail craft, watched by excited crowds. Jams often occurred. Boats were dashed to pieces against each other or bridge piers or dams. Men were drowned or crushed.

Entire cargo of a flatboat fleet of the 60's could be carried in one of today's 10,000-barrel steel petroleum barges operating on Ohio-Mississippi river system.

Disaster often hit oil fleets on voyage to Pittsburgh. An ice gorge in 1862 crashed into 350 boats with 60,000 barrels of oil aboard, crushing half of them, spilling the oil. Loss was over $350,000. Fire broke out in one fleet, which tore loose and bridged the Allegheny with flames. One barge drifted to Franklin, Pa., burned wooden bridge there.

6,000 teams were engaged in oil hauling along Oil Creek in 1860. In one day 2,000 wagons passed through Titusville, Pa.

Actual photos of "pond freshets" in action on Oil Creek, found by Dr. Paul H. Giddens, curator of Drake Well Memorial Park, Titusville, Pa., among families of old-timers in the oil fields, were loaned to artist Orison MacPherson for guidance in painting "Oil Transport" on opposite page.

For free print of "Oil Transport," write Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

Tank trucks and cars of J&L Otiscoloy steel weigh less, carry more, last longer.

First "tank" cars were merely wooden flatcars equipped with 40-gal. wooden tubs.

For a free copy of J&L book, "Tubular Products for the Oil Industry," write nearest District Sales office listed at left, or Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

Our Billion-Dollar

By H. H. ANDERSON, Vice President, Shell Pipe Line Corporation

WHEN Mike Jacobs can draw a million-dollar gate for a one-round main event, we concede that Barnum was right. But what about us in industry who are needlessly paying billions* for a show we can't even see? I refer to soil corrosion—Nature's relentless attack on our buried pipe lines, power and communications cables, rail systems and other metal structures. And I say "needlessly" because much of the damage can be stopped by cathodic protection if we will appreciate and apply this simple principle disclosed by Sir Humphrey Davy in 1824!

Cathodic protection can save industry from myriad costly service breakdowns, commodity losses, customer ill-will and plant repairs and renewals. Yet many corrosion engineers tell me that a prime limitation on its use is that management is not yet sold on it. These ardent exponents know how simply it works, how great is its value, how tangible is its economy, and how it warrants broader acceptance. Thus I suspect many engineers have confused instead of enlightened the boss with too much detail while trying to explain facts that seem obvious to them. Believing that every operating executive owes it to his business to be at least on speaking terms with cathodic protection, I beg to introduce you herewith.

Let's raise the iron curtain on this billion-dollar show. We started it ourselves when we buried our refined metal structure bare (or practically so) in the soil. This upset Mother Nature's age-old chemical balance, and the old dame promptly started soil corrosion at work to restore it. Soil corrosion of metal is caused by a localized attack of soil chemical solutions. It starts where the soil is more moist and acid or alkaline than average, or it can start at a defect in the metal surface. It generates electric currents which flow from the point of attack out through the soil back elsewhere to the metal.

Assault and Battery

You recall that in a common battery the solution attacks the zinc or baser metal, called the "anode," to generate a current. This current flows out through the solution to the carbon, called the "cathode," thence through a metallic circuit back to the anode. And what of our buried structure? Contacted by the varying soil solutions of Nature, its bare surface serves both as anode (the area under attack) and as cathode (the rest of its surface) because its metallic continuity forms a circuit between them. As shown in Figure 1, if our structure is long (or is of large area) it can be a part of many such natural batteries, and thus it can have a series of anodic and cathodic sections.

Soil moisture, that well-known H_2O, plays a dual role in our subterranean melodrama. Figure 2 shows a molecule at work! during the chemical attack some of the water divides into hydrogen and oxygen, each going its separate way. Oxygen is the one that attacks our structure. Its corrosive atoms create an anode, which responds with a weak but determined electric force that sends currents out through the soil seeking a cathode. But hydrogen rushes to the rescue. Its atoms ride the currents through the soil and cover the rest of the bare surface. Soil chemicals cannot pierce the hydrogen film, thus it shields all but the immediate area under attack; i.e., it protects the metal by forming a cathode. Eureka! There's a clue to cathodic protection. If we can cover *all* of the surface with enough hydrogen we may protect it completely.

And how is this to be done? As they say in the movies, we merely get a "stand-in" or a substitute anode. Through it we can apply other currents strong enough to enter our structure's entire surface via the soil, thus overpowering and reversing the local battery currents trying to leave. The simplest way to protect a steel or lead structure is to merely bury a chunk of baser metal (such as magnesium, aluminum or zinc) near the structure, and connect the two by an insulated wire. Oxygen has a greater affinity for this baser metal, so—as long as the two are connected by the wire—it instead attacks the baser metal. This responds more vigorously and forces much stronger currents out through the soil en route to our structure. As shown in Figure 3, hydrogen again rides them all and makes a cathode of its entire surface—even the areas before under attack. The currents return from the structure to the baser metal anode through the wire. In the process, the baser metal instead of our structure is slowly oxidized or corroded away. Biblically speaking, it lays down its life for a friend. That's why we call it a sacrificial (or "galvanic") anode.

A Knock-Out Punch

Some soils are so corrosive as to require stronger measures. Here we may bury a mass of junk iron or steel (or a carbon rod) nearby to serve as the anode. Then with insulated wires we connect a strong external direct-current source, such as a ten-volt generator or rectifier, (+) to the junk and (—) to the structure. The generated currents

Presented at Annual Conference, National Association of Corrosion Engineers, April 7, 1947, at Chicago.

* According to Bureau of Standards Circular C-450, the annual cost of pipe line replacements due to corrosion is approximately $200 million per year! This does not take into account the costs of replacing various other types of plant suffering from soil corrosion.

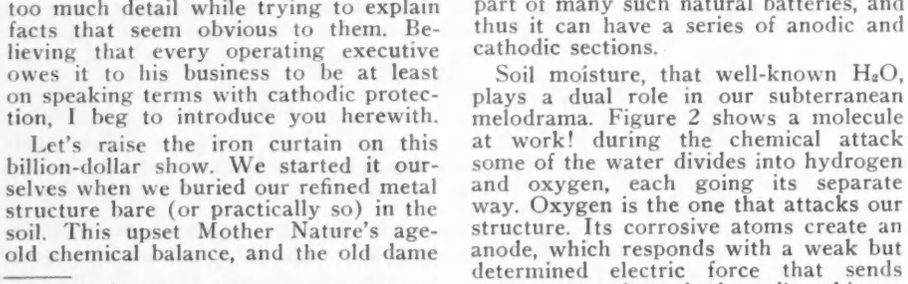


Figure 1. Series of batteries caused by attack of patches of sour or moist soils along a structure. Arrows show currents flowing from anodic areas (areas of attack) to cathodic areas.

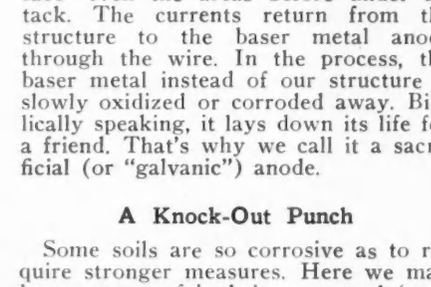


FIGURE 2

Side Show

. . . FOR MANAGERS ONLY

CATHODIC Protection is deemed so important that eight industry associations, the two nation-wide communications systems and a professional association recently joined their effort in a committee to inform managers about it, to promote cooperation within and between industries in applying it, and to aid the local solution of its technical problems. This work will take time. Thus, as chairman of the Correlating Committee on Cathodic Protection, I am presuming personally to "jump the gun" with this direct appeal to management for understanding and cooperation.

H. H. Anderson

force their way from the junk anode through the soil into the structure and smother it with hydrogen. The junk will be eaten away in time and must be replaced. A single such unit, being ten times more powerful than a galvanic anode, can protect several miles of structure under some conditions. The choice of a current-supply in each case poses some nice problems, not only in meeting the need but also in the balancing of first costs versus recurring expenses.

Our buried structure can be protected also with special enamels or coatings. But only during the last few years have we learned how to apply these properly. There's many a mile (and acre) of structure with defective coatings; and these may be worse than none because such defects act to focus corrosion and localize pitting. What are we to do about them? The cold sod is a poor and expensive place in which to apply new coatings, anyhow. Thus, if our structure's present coat is tattered, cathodic protection may provide safety with economy.

When installing new metal structures, many shrewd operators know that a modern enamel coating, properly applied, plus *some* cathodic protection is best economy in the long run. They never can predict infallibly the soil action along a new route, and they know it costs about five times as much to later dig it up, clean, repair and coat a line than to coat it right in the first place. They know also that a bare metal structure must be extra thick to allow for corrosion pitting, and that this extra metal costs about as much as a good coating. But even the best of coatings may develop defects (either while being buried or later); so a light supply of hydrogen should be on guard to fill the holes. Thus *some* cathodic protection is good insurance even on a newly-coated line.

It looks as if that should end our troubles, but no. For better or worse, every current must flow back to its source. If a neighbor's metal structure is adjacent, or if it crosses but does not touch ours, and it is within the field of the currents flowing from our protective anodes to our structure, some of the generated current may possibly "stray" into his structure (which provides a low-resistance path) and flow through it to the point nearest ours. There the current must leave his structure to jump through the soil back into ours and return to its source. We saw before that chemical attack on metal will cause current flow. Well, it also works in reverse! Where our stray current leaves his structure to enter the soil, it may cause chemical attack or local corrosion. This action is called "electrolysis."

Electrolysis can be as bad as true soil corrosion because, with either one, a current flow of one ampere in a year will destroy 20 pounds of steel or iron, or 75 pounds of lead. And both usually focus to cause pit-holes which soon pierce our structure. Electrolysis can be avoided by connecting a resistant wire or "bond" between the two structures to drain the returning stray current from the adjacent structure into the protected one. This "drainage bond" must be well-designed, however, because too little drainage will not stop the interference, while too much will give our neighbor real cathodic protection at our expense. We want to be friends, don't we—but not philanthropists! It was said above that a good coating reduces the current needed to cathodically protect our structure. The lesser current, in turn, reduces the chance of electrolysis to occur!

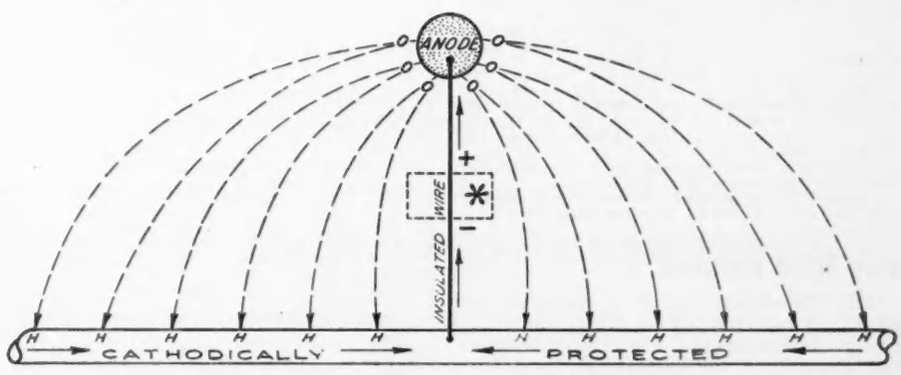
Strong stray currents from electric railway tracks have long caused electrolysis of other buried structures in cities. Several competent local committees have worked for years to minimize this action. However, with the steady conversion by transit companies to motor-bus and double-trolley coach service, that trouble is abating through removal of its cause. Conversely, true soil corrosion is spreading in cities because removal of the stray currents allows the weaker currents to Nature's batteries to flow unopposed. Thus city operators, too, must increase their interest in cathodic protection.

The Denoument

If we want to use cathodic protection, we can ill-afford to interfere with neighboring structures by electrolysis. Yes, and our neighbors can ill-afford to have this done. But decorum tells us that our corrosion engineer should not trespass the other structures—even to make the tests needed to design the drainage bonds. However, if our neighbors also are acquainted with the problem and will cooperate for the common good, they will welcome the tests, the technical details can be readily worked out, the bonds can be installed and all structures will be benefited.

Often we may want to install cathodic protection where a neighbor's structure parallels ours for quite a distance. Then his structure will absorb much of our precious current and need several drainage bonds merely to prevent interference. Here we often can save money by inducing him to install cathodic protection, too. And why not, if his structure lies in the same corrosive soils? Several large companies have installed many protection units jointly. Capital as well as operating expenses are shared equitably, and with mutual satisfaction. Here, again, acquaintance with the general problem at the management level aids the engineers to work for maximum protection and economy. Such results help the customers, and please the stockholders.

As the curtain drops on our show, we can take stock. Does cathodic protection work simply? In essence, yes; we just get a current source or anode and spray on a little hydrogen. Is its value



* Generator may be placed here if galvanic anode is not used.

Figure 3. Long structure showing currents from buried anode entering structure. All oxygen attack is at anode. Structure is entirely protected by hydrogen.

great? Why not—if it stops corrosion. Does it need a special kind of cooperation? It doesn't if we are all acquainted with its problems and will follow the Golden Rule. But what about its tangible economy? If you are not already sold, a good corrosion engineer probably can prescribe it for your own structures and soon convince you of its economy. But to stress my main point, you can see that cooperation with others in cathodic protection is good business.

The problems of cathodic protection aren't really as simple as I've made them seem. Their solutions call for data, science and experience mixed with plenty of plain horse-sense. But our corrosion engineers will work them out for us and thereby lessen industry's heavy losses from soil corrosion to the extent that we afford them the opportunity and lend our sympathetic support!

Mid-Continent Division API Announces Program

The program for the spring meeting, Mid-Continent District, American Petroleum Institute, Division of Production, to be held at the Herring Hotel, Amarillo, Texas, May 22-23, has been announced.

Presiding at the May 22 sessions will be H. S. Kelly, Phillips Petroleum Company, Bartlesville, Okla., and R. C. Kay, Amarillo, at the opening session, and J. R. Evans, Stanolind Oil & Gas Company, Tulsa, and John H. Murrell, DeGolyer and MacNaughton, Dallas, at the group sessions.

In charge of the May 23 group sessions will be H. H. Kaveler, Phillips Petroleum Company, Bartlesville; W. L. Horner, Barnsdall Oil Company, Tulsa; C. M. Copeland, Williams - Copeland Drilling Company, Tulsa; and Fred J. Neslage, West Pampa Repressuring Association, Pampa, Texas.

Speakers and the title of their papers include:

"State Cognizance of Federal Power," Don Emery, vice president and general counsel, Phillips Petroleum Company.

"A Progressive Program on Public Relations for The Oil Industry," speaker to be announced.

"Productivity of Individual Zones Used for Determining Completion Efficiency, Hugoton Field, Kansas," R. B. LeFevre and Henry Schaefer, Stanolind Oil & Gas Company, Tulsa.

"The Monroe Gas Field and Its Pressure Behavior," Don T. MacRoberts, United Gas Pipe Line Company, Shreveport, La., and Preston Fergus, Union Producing Company, Monroe, La.

"Developments in the Carbon Black Industry," Ira Williams, director of research, J. M. Huber Corporation, Borger, Texas.

"Unitization of Oil Fields in the United States," K. E. Beall, manager, economics department, Phillips Petroleum Company, Bartlesville, Okla.

"Results of Experimental Water Flooding in a Lime Reservoir Originally Under Dissolved Gas Drive," P. S. Ervin, Haynesville Operators Committee, Haynesville, La.

"Developments in the Restored State Method for the Determination of Oil in Place and Connate Water," W. A. Bruce and H. J. Welge, The Carter Oil Company, Tulsa.

"Diamond Coring Versus Conventional Methods of Penetrating the Weber Formation in Rangely Field," R. E. Pou, E. W. Olson, and C. G. Congdon, The Texas Company, Rangely, Colo.

"Complete Graphical History for Drilling Wells," (In process of negotiation).

"Some Practical Suggestions for Drilling Rig Layout," Glenn D. Hughes, Sun Oil Company, Tulsa.

Pay Hike Refused

The Oklahoma House of Representatives has rejected $3500 salary increase for members of the State Corporation Commission. A bill introduced by J. H. Arrington, Stillwater, would have paid them this additional money from the State Conservation Fund, which is financed by a special tax on oil.

Correlating Committee On Cathodic Protection Completes Organization

Since August, 1946, work has been in progress to organize the Correlating Committee on Cathodic Protection, an inter-industry activity to publicize and to improve procedures for handling problems arising from cathodic protection of pipe lines, communications cables, railroad signal systems and other buried metal structures. Cathodic protection is an effective retardant of soil corrosion which is damaging industrial plant to the extent of at least $200 million per annum. To date 11 nation-wide organizations have taken formal action to join in the activity and have each named two representatives on the committee.

The member organizations are Association of American Railroads, American Gas Association, American Petroleum Institute, American Public Works Association, American Water Works Association, Bell System, Edison Electric Institute, International Municipal Signal Association, Inc., National Association of Corrosion Engineers, United States Independent Telephone Association, and Western Union Telegraph Company. Chairman of the committee is H. H. Anderson, vice president, Shell Pipe Line Corporation, and secretary is F. E. Dolson, engineer, St. Louis County Water Company.

As originally announced, the initial objective will be achieved by a program of education and assistance to be accomplished through the drafting of general and technical bulletins. It is planned that these bulletins will be published and distributed by each industry to its own membership. The titles of the four bulletins, and the representatives appointed by the chairman to prepare each, are as follows:

1. General Information

Active

NACE: O. C. Mudd, chairman
AAR: R. B. Amsden
AWWA: A. R. Davis
EEI: M. W. Ghen
USITA: L. C. Burden

Associate

API: L. F. Scherer
AGA: Guy Corfield
APWA: R. J. Kuhn
Bell: J. M. Standring
IMSA: J. D. Southwell
W-Un: J. F. Blain

2. Notification Procedure

Active

API: L. F. Scherer, chairman
AAR: A. E. Archambault
AWWA: F. E. Dolson
IMSA: Frank Smith
USITA: L. W. Hill
W-Un: J. G. Blain

Associate

AGA: F. J. McElhatton
APWA: To be named
Bell: K. L. Maurer
EEI: T. G. Hieronymus
NACE: O. C. Mudd

3. Technical Practices

Active

Bell: K. L. Maurer, chairman
AGA: Guy Corfield
APWA: R. J. Kuhn
EEI: T. G. Hieronymus
NACE: M. C. Miller
W-Un: Orris McGinnis

Associate

AAR: R. B. Amsden
API: H. H. Anderson
AWWA: A. R. Davis
IMSA: Frank Smith
USITA: L. C. Burden

4. Joint Installations

Active

AGA: F. J. McElhatton, Chairman
API: H. H. Anderson
APWA: To be named
Bell: J. M. Standring
IMSA: J. D. Southwell

Associate

AAR: A. E. Archambault
AWWA: F. E. Dolson
EEI: M. W. Ghen
NACE: M. C. Miller
USITA: L. W. Hill
W-Un: Orris McGinnis

Although the committee expects to promulgate quite specific suggestions for handling various types of situations, it will refrain from dealing with any immediate local problems. It proposes also to work in harmony with existing Metropolitan Electrolysis Committees whose present effective work with cathodic protection is recognized and commended.

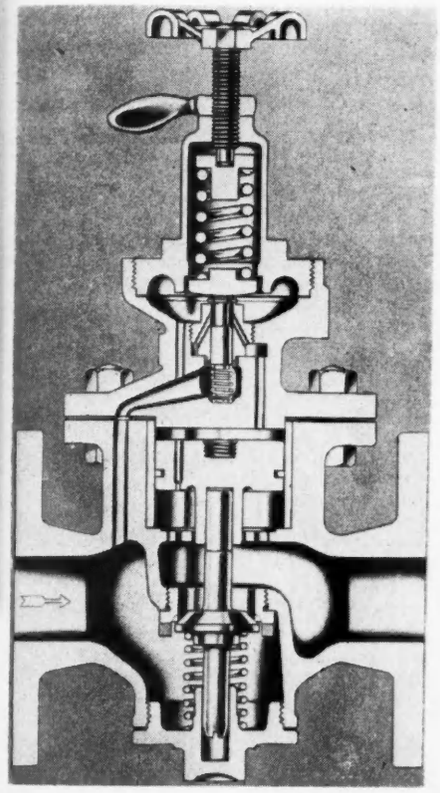
NEW EQUIPMENT
LITERATURE

FOR ADDITIONAL INFORMATION, USE MAILING CARD INSERTED OPPOSITE THIS PAGE

1—Unloading Valve

A throttling-type unloading valve, Class UL, for use with steam, air or gas has been designed for applications wherever a throttling-type regulating valve is required to maintain a constant inlet pressure by relieving the excess to a lower pressure system. A feature claimed for the instrument is smooth throttling control during the entire cycle of operation combined with quick action under sudden pressure variations.

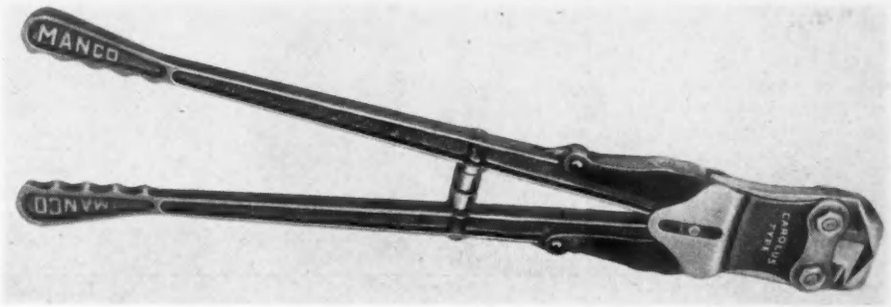
Construction features include high-



pressure bronze body, renewable wearing parts, hard-surfaced seat ring, hardened stainless steel main and controlling valves, bronze piston, corrosion-resistant piston rings, phosphur bronze diaphragm. This valve is available in sizes from ½-inch up to four-inch; for inlet pressures from 25 to 300 pounds per square inch, inlet temperatures up to 550° F., and pressure difference not less than 15 pounds per square inch.

Leslie Company, 167 Delafield Avenue, Lyndhurst, N. J.

(Check item 1 on postcard for more information.)



2—Bolt Cutter

The improved Carolus type cutter features drop forged handles to replace the conventional malleable iron castings adding strength to the tool. The streamlined design includes socket screws in the adjustment sections and countersunk eccentric head strap bolts which maintain factory-set tension on the head assembly.

Another unique feature is the two-way cutting jaw providing both side and end cutting action, which enables the operator to cut bolts in hard-to-get-at places. These cutting jaws are also available in a three-way combination incorporating a nut splitter.

Through compound leverage, the application of 100 pounds pressure gives four tons cutting power at the jaws. Easily portable, the tool, according to the manufacturer, offers many time-saving advantages over the use of a cold chisel or blow torch for the many jobs which require the cutting of bolts, rod or wire. It is designed to cut all metals up to the hardness of case hardened steel. Special tools are available for cutting hardened material.

Manco Manufacturing Company, Bradley, Ill.

(Check item 2 on postcard for more information.)

3—Boiler Tube Support

A mechanical improvement in supporting return bends in boiler tubing has been announced. The new improvement is in the form of a removable clamp

which provides a rigid support for the furnace tubes when the return bend body is removed for tube inspection. Formerly, the announcement stated, it was possible for the tubes to become misaligned when the return bends were removed.

A split clamp fits around the upset tube ends and is held in position by a single bolt. Once installed, the clamp is

not removed until it is necessary to replace the tubes.

Thornhill-Craver Company, 1701 Lockwood Drive, Houston.

(Check item 3 on postcard for more information.)

4—Tong Pull-Back Spring

This new tong pull-back spring is scientifically designed to take care of the long sweeps of the tongs and to provide maximum spring service. Illustrated is the "barrel-rolled" pull-back spring slightly stretched. According to the manufacturers, this is the only spring that stretches in the middle before it stretches at the ends. Because of its construction, the stretching and the jerking to which it is subjected are distributed more evenly throughout the spring, thereby prolonging its life. This spring is equipped with eye swivel ends. The spring weighs 13½ pounds and is 55 inches in length. At the center it is 2¼ inches in diameter, while at the ends it is 1¾ inches in diameter.

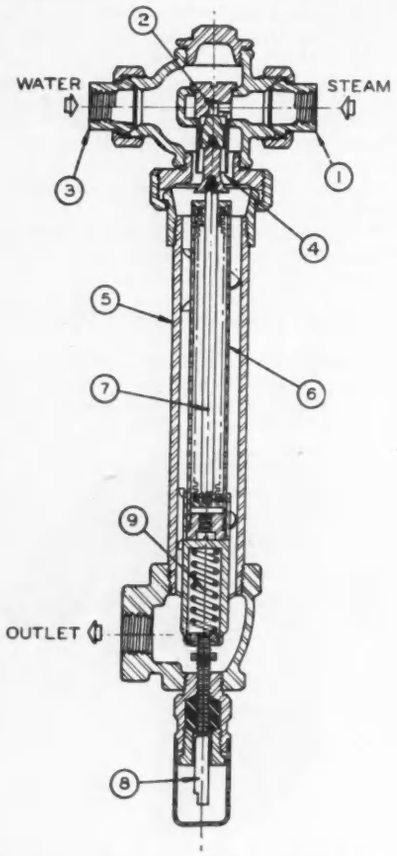
Weatherford Spring Company, Weatherford, Texas.

(Check item 4 on postcard for more information.)

5—Steam and Water Mixer

Designed to eliminate the necessity of piping hot water long distances or installing separate water heaters and temperature regulators at isolated points is this new steam and water mixer. Measuring 26 inches long and five inches wide at the head, the mixer has a builtin thermostat which provides sensative temperature control. Its hot-water capacity is rated at 200 gallons per hour for a temperature rise from 50 to 120° F. with steam pressure at 75 pounds.

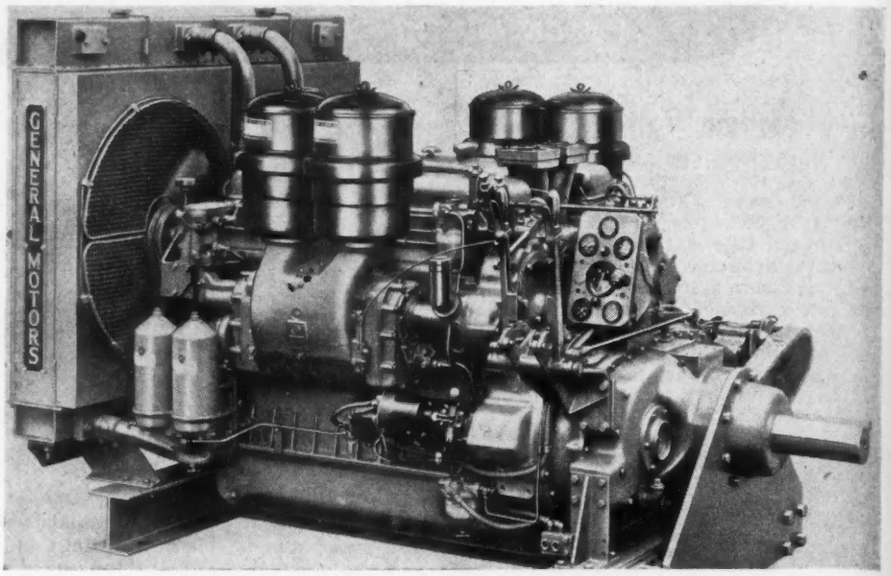
In operation, steam enters at 1, goes through valve 2. Cold water enters at 3, and mixes with steam in the injection chamber, 4. The resulting mixture of hot water enters housing 5, and flows over thermostat 6 which is filled with Sarco liquid and hermetically sealed. When the hot water flows over the thermostat, this liquid expands, gradually pushing forward plunger 7 to close valve 2 and to cut off steam at temperature set at 8 by the key furnished. Body 5 then cools by



radiation, and the liquid in the thermostat contracts and the plunger head 7, opens valve 2. In operation, a balance is secured which holds the steam valve open just sufficiently to maintain the desired temperature. Relief spring 9 prevents damage from accidental overheating. The entire construction is of brass with renewable valve heads and seats of stainless steel. Maximum steam pressure is 125 pounds per square inch, which pressure must be at least 20 percent higher than the water pressure.

Sarco Company, 475 Fifth Ave., New York 17.

(Check item 5 on postcard for more information.)



6—Diesel Engine Models

Of interest to operators and manufacturers of oil field equipment is the improved series 71 "Twin 6" diesel engine models. Each twin unit is made up of two basic six-cylinder, two-cycle engines geared to a single shaft. Units are offered with either right or left-hand rotation. Continuous brake horsepower at 1800 revolutions per minute is 276 with a maximum rating of 400 at 2000 rpm.

An outstanding feature is said to be the variety of power takeoff arrangements available. Any one of four transfer gear types can be selected as follows: (1) The heavy duty power takeoff has been designed to take pulley and chain drive side thrust without the need for a special cradle-mounted sheave or sprocket. (2) The stub shaft is designed for the various types of couplings encountered with compounds and other oil well machinery. (3) The drive flange is available for installations where the driven machinery is to be coupled directly to the power unit. (4) The S.A.E. "O" size housing has been designed to support any close coupled power takeoff within the proper horsepower range. Particular attention has been given to its application with torque converters.

Gear ratios of 1:1 direct drive, and 1.33:1, 1.77:1, and 2:1 reduction are available with each of the four power transfer gear assembly types. An increase in the shock load capacity over earlier models has been accomplished by the introduction of improved heavy-duty transfer gears constructed with a 25 percent increase in face width.

Engine units can be obtained with either radiator or heat exchanger cooling systems, depending on the nature of application. Specially designed flanges can be furnished for those installations employing remotely located radiators. Commensurate with the general aim of increased sturdiness, the engine base has been provided with stronger "I" beam supports. These are so arranged as to facilitate removal of one or both of the engines.

The battery charging generator, tachometer drive, and accessory drive are all connected to the gear box, enabling them to function when either of the two engines in the unit is not in operation.

Heretofore, the GM diesel multiple engine units have been equipped with only a single electric starting motor. With the new twin models, dual electric starting motors as well as gasoline starting equipment are obtainable as optional selections for the first time.

Detroit Diesel Engine Division, General Motors Corporation, 13400 W. Outer Drive, Detroit 23.

(Check item 6 on postcard for more information.)

7—Chemical Rust Remover

Another war production development is a liquid rust remover said to be effective on any metal surface in removing even the thickest coat of rust. Manufacturers claim it is so penetrating it reaches pin point spots, pits, crevices, cracks or corners, and that it can be applied in a minimum of time with a paint brush or cotton swab, requiring no rubbing.

Marketed under the trade name of Cordex, the new chemical is non-explosive, non-inflammable, and will not injure metal or the hands of the user. Small rust-coated objects may be treated by dipping the articles in a glass, jar or crock of Cordex. The makers say the action of the chemical is rapid and that after treating the corroded surface, either by hand application or by dipping, Cordex will dissolve light rust in a few minutes, while longer applications will remove a coating of rust up to one-quarter inch thick. The article may then be wiped with a clean, dry cloth.

It is now available in 12 ounce and quart bottles and gallon containers. The product is available to industrial users in any quantity from one gallon to 55 gallon drums.

Allied Products Company, 1133 W. Newport St., Chicago 13.

(Check item 7 on postcard for more information.)

MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

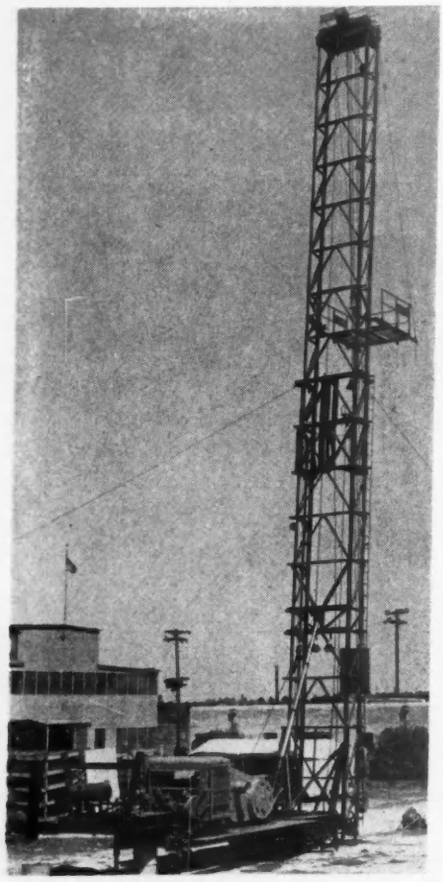
Climax Molybdenum Company

500 Fifth Avenue · New York City

MOLY

8—Portable Rig

The new field-proven "Rambler" rig features a combination of the Hydrair Hoist" and the "Kwik-Lift Mast" to provide operators with a portable drilling unit which may be either truck or trailer



mounted. Designed for drilling oil, gas or water wells, the Rambler rig is said to provide smooth operation and economy.

Hydrair Hoists are fluid-powered and driven by direct air clutches. Infinite, variable speed without gears is obtained through the combined use of a torque converter and a Hi-Lo instantaneous speed change arrangement. Fluid power automatically adjusts speed ratios to the most favorable operating conditions and provides maximum pull for coming out of the hole without shock or clutch slipping.

A single lever for high, low, neutral and throttle, operates all air controls and eliminates a maze of foot pedals and hand levers. Direct air clutches require no adjustment, no lubrication with positive and complete disengagement assuring minimum wear while idling. Hydrair Hoists are available in single- or double-drum models in three sizes, 25,000, 30,000, and 40,000 pounds maximum single line pulls.

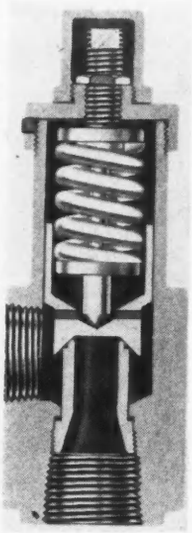
The Kwik-Lift telescoping masts are hydraulic operated for safety, speed and convenience. A special patented design furnishes mobility, flexibility and fast operation to meet all field requirements. Masts are available in heights of 62, 89, 90 and 96 feet with net hook load capacities ranging from 70,000 to 250,000 pounds. They can be installed on truck or semi-trailer and may be detached while hoist is used under conventional derricks.

International Derrick & Equipment Company, Columbus, Ohio.

(Check item 8 on postcard for more information.)

9—Safety-Release Valve

A simplified relief valve for pressures up to 10,000 pounds per square inch is fabricated completely from bar stock—bronze, cold rolled steel or stainless steel, depending on the service for which it is intended. In either case the disc and nozzle are of stainless steel. It is available with or without test gear, in three body sizes—½-inch, ¾-inch and 1-inch. Interchangeable nozzle inserts provide for proper capacity at set pressures in three ranges —2000, 5000 and 10,000 pounds per square inch for each size.



Exceptionally high flow efficiency, with a coefficient approximating unity, is said to be obtained by virtue of the high lift of the disc brought about by the high kinetic energy of the discharge developed by the venturi action of the nozzle. A noteworthy reduction in the number of parts normally required in a valve for such services, has been achieved. The top-guided disc piston with its two-point bearing surface is completely free acting. Both bottom inlet and side outlet connections are tapped directly in the valve body. High carbon steel loading spring is completely enclosed and protected. Nozzle seat is well above the drain line, hence remains dry and is not subject to accumulations of scale or sediment.

Farris Engineering Corporation, 480 Commercial Ave., Palisades Park, N. J.

(Check item 9 on postcard for more information.)

Literature

10—Pumps, Compressors

"Oilfield and Pipe Line Equipment" is a new 16-page, two-color catalog which describes many types of pumps including centrifugal, steam duplex, direct acting simplex, duplex power pumps, plunger pumps, variable triplex power pumps, rotary pumps and general service pumps.

Briefly described are steam and gas-engine driven air and gas compressors, as well as steam turbines, turbo-generators, reducing and increasing gears. Three types of air compressors are illustrated with applications listed. The catalog contains 48 illustrations of equipment along with specifications and other pertinent engineering data. Type numbers and capacities are given in the case of the centrifugal pumps.

Worthington Pump and Machinery Corportion, Harrison, N. J.

(Check item 10 on postcard for more information.)

11—Oil Field Tools

Catalog SCS-101, contains information on several useful oil field tools. The two-color catalog is 12 pages long and presents data as well as descriptive information on the equipment and methods used in cementing casing with the aid of spiral centralizers and reversible scratchers. Well caliper logs and temperature surveys present graphic evidence of results obtained with these new tools.

Specifications and price schedules for all sizes of both tools are included. Instructions accompanied by photographs, show how both the stabilizer and scratchers are installed. Descriptions, specifications and prices are listed for cement baskets, "Long Life" pull-back springs, and drill pipe wipers.

Weatherford Spring Company, Weatherford, Texas.

(Check item 11 on postcard for more information.)

12—Air Hose Catalog

A catalog section on air hose designed for extensive use in industrial fields has been published. The new section describes the construction and advantages of each type, outlines the application for which it is especially suited and gives data on sizes, braids and plies, pounds per 100-foot lengths, maximum lengths, outside diameters and working pressures.

The B. F. Goodrich Company, Akron, Ohio.

(Check item 12 on postcard for more information.)

13—Diesel Engines

"Diesel Engines for the Oil Fields" is a six-page, two-color brochure describing the model 567B series Streamliner Diesels. The two-cycle uniflow scavenging system is diagrammatically shown, with enumerated advantages. Photographs and outline drawings show general appearance and dimensions. Specifications and power curves are also presented in booklet DR-113.

General Motors Corporation, Petroleum Industry Sales, Philtower Building, Tulsa.

(Check item 13 on postcard for more information.)

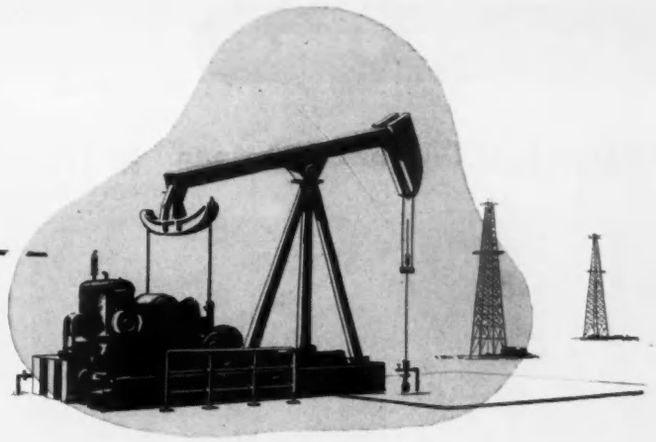
14—Engineering Committees

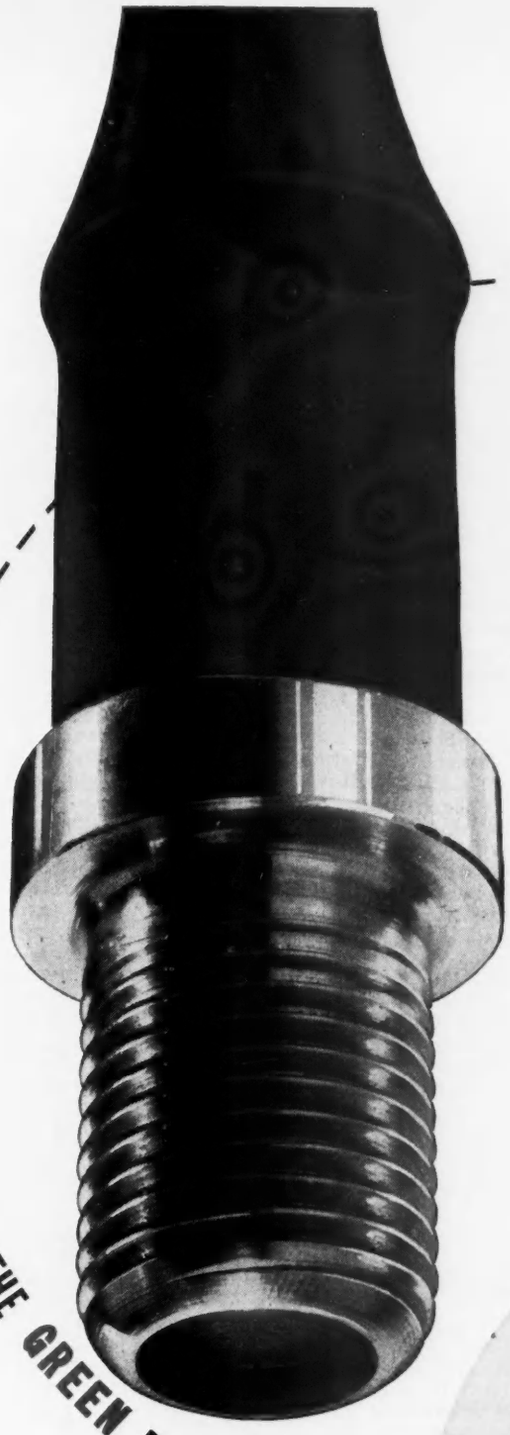
Organization and functioning of oil field engineering committees is the subject of a booklet released by the Interstate Oil Compact Commission. The publication contains a report by a subcommittee of the commission's legal committee, appointed to study oil field engineering committees and draft provisions suitable for use in their organization.

Included also are organization agreements of 11 engineering committees, as follows: Yates, Conroe, East Texas, Goldsmith, North Basin, Carthage, La Gloria, Seeligson, Lea County, West Edmond and Mississippi.

Interstate Compact Commission, P. O. Box 3185, Oklahoma City.

(Check item 14 on postcard for more information.)





DEPENDABLE

No worry about premature failures when you run a *selected* string of Jones sucker rods. They're in for a long stay.

Built to lift tons of weight many times per minute, these rods successfully resist shock, abrasion, corrosion and other deteriorating elements. Into each rod goes all the skill, craftsmanship and metallurgy possible only with the most modern methods and machines plus the experience of 56 years.

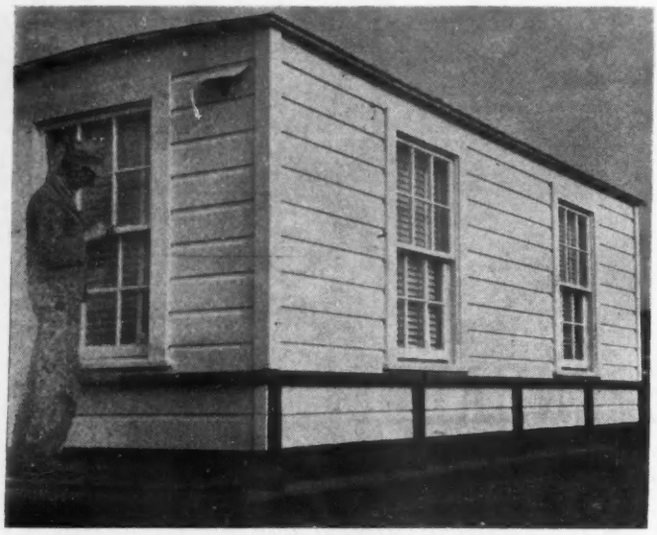
LOOK FOR THE GREEN RODS

● *Write for booklet on the "Care and Handling of Sucker Rods" as well as your copy of a folder describing the new Snap-Tite Wrench.*

JONES
SUCKER RODS

★ **THE S. M. JONES COMPANY**
(Subsidiary of Buffalo Bolt Company)
General Office and Factory: TOLEDO, OHIO
Sales Office: McBirney Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

Protect Tool Pusher's "Cottage" In Transit

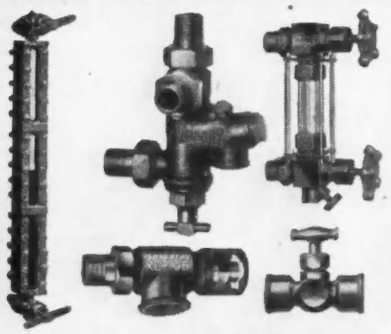


EQUIPMENT HANDLING

The tool pusher's "cottage" is becoming an ordinary scene around the modern drilling rig. A wooden building is much cooler in the summer than a steel one, but the chances of a wooden building standing very many moves on the modern oil field truck are very remote. To overcome this difficulty one contractor built the base and guard rails out of steel to allow for rough handling in moving, but made the remainder of wood. The base is made from a framework of four-inch drill pipe with short pieces laid crosswise to raise the building off the ground. This also provides space for chaining down the base of the building while in transit without running chains over the wooden parts of the building. The cross pieces extend six inches beyond the sides of the building and two-inch uprights are welded vertically to each end. A two-inch railing is then placed on top of the uprights and run entirely around the building. This guard rail also provides protection from trucks and cars which may be parked near the cottage.

$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas

PENBERTHY
QUALITY
PRODUCTS



Penberthy liquid level gages of various types—injectors—ejectors—all so widely used throughout the oil industry because they have always been dependable under the most severe service conditions.

All are of rugged construction and made by an organization with 57 years experience in the manufacture of quality products.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

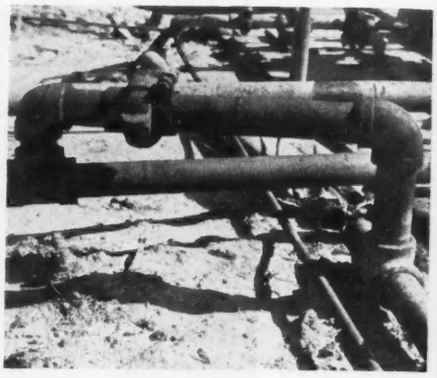
Cover Cathead Shaft Key

SAFE PRACTICES

Where the key of the drawworks shaft (to which is mounted the spinning cathead) extends beyond the outboard cathead flange, a practical suggestion to provide additional protection for the crewmen is illustrated. A cap is made to cover the extending key, thereby preventing the cathead man or any other crew member from accidentally being struck by a spinning sharp edge.

The cap may be made up in the welding shop from an old round-bottom pot, or it may be turned down on the lathe from a solid form, or even welded and turned down. It is mounted on the shaft by drilling a tap hole into the center of the shaft and threading the hole. A bolt is placed through the center of the cap and screwed into position as shown. The edges of the bolt are rounded to minimize damage to clothes or skin in case of contact. It also prevents the cathead man's gloves from being torn from his hands when operating the cathead.

Compensate Line Expansion

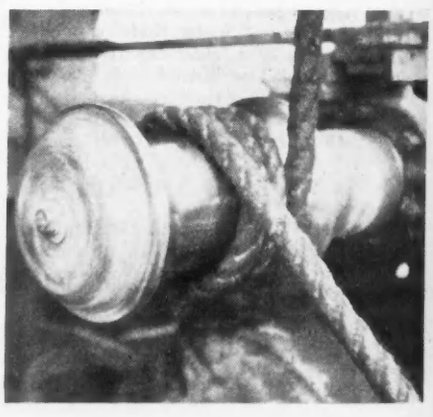


STEAM LINES

When safety considerations require the location of the boilers to be some 500 feet away from the rig, the expansion and contraction of the long steam line introduced a variation of several inches between cold and operating temperatures, and required special provision for absorbing this shift without distorting the line to pumps or derrick.

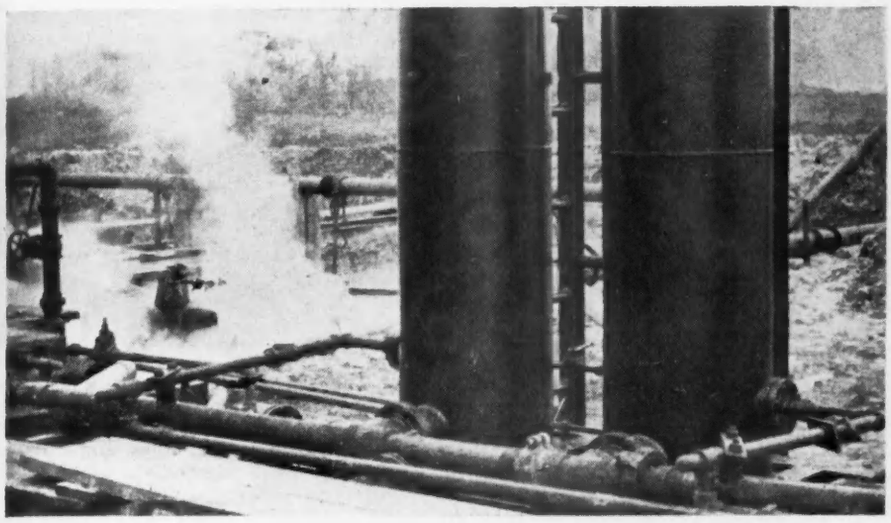
The steam main, formed from 4½-inch drill pipe which was sound, but on which the integral joints had been worn below safe minimum diameters, was laid straight from boilers to a point on the transverse line midway between derrick and pump setting. A tee on the end of the steam line, and another cut into the feeder unit, carried the swing, each end being carried on nipples rising vertically from the side outlets of the tees.

As close to the ell on the nipple in the feeder-line tee as could be readily made up was placed a spherical union, with the male end on the short length of pipe extending from the ell. The other half of the union was carried on a two-foot piece of pipe extending from the steam-main elbow. Angular displacement as the line changed its length was taken up beside flexing of the 4½-inch drill pipe, while elongation of that unit was absorbed by the spherical union and, to a much lesser degree, by the threads in the riser and fittings at the end of the long steam main.



DRILLING HINTS

Effect Savings In Shop-Made Heat Exchanger



Drilling contractors are prone to use fresh water in the boilers and allow the condensate to go to waste since gas is usually cheap where an oil field is being drilled up. However, contractors in the Gulf Coast where gas is relatively cheap are finding that the savings incurred in condensing exhaust steam and heating the feed water at the same time are well worth the expense of erecting and transporting a heat exchanger. This is especially true where it is necessary to treat the feed water to protect the boilers and other steam equipment. The heat exchangers shown were fabricated from two pieces of twenty-four-inch pipe, set on skids and equipped with two-inch pipe coils to conduct the feed water through the exhaust steam. As the feed water is heated, it condenses the steam which gravitates to the pump pit for further use as feed water.

STEAM SYSTEMS

Although saving fuel, this arrangement is most important in that it reduces the amount of water treatment and saves on water consumed.

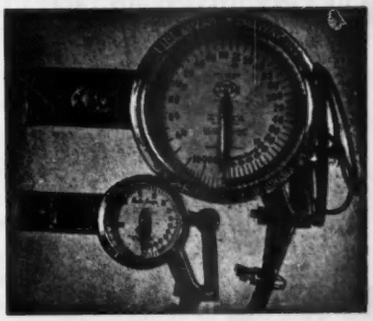
Facilitate Handling Large-Size Elevators

Where short strings of relatively large diameter casing are to be run, one operator facilitates handling the heavy, large elevators by using ¾-inch wire line slings. During the operation, two sets of elevators are used. One set, as shown, rests on two closely-spaced I-beams to suspend the string of casing already in the hole, while a second set is used to pull another joint of the large-diameter pipe up into the rig. Once screwed into the string, the upper elevator takes the full load and the lower set removed by a cat line and latched onto a new joint. In the meantime, the string of pipe is lowered into the hole until the elevator rests on the beams as illustrated. The process is repeated until the desired depth is reached.

EQUIPMENT HANDLING

Where the weight increases beyond the safe limits of the wire rope sling, the latter is doubled to handle the load. The wire rope slings are easily removed and reattached to the elevator as the running-in process continues. Their light weight and flexibility aid the crewmen in the above operation.

LINE SCALES



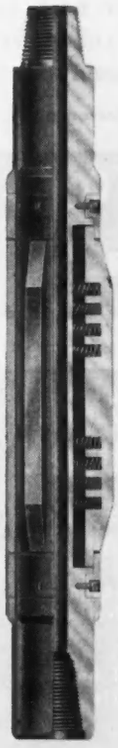
20 MODELS to choose from

(Above) Super 500,000# capacity, 14" dial. (Below) Packer Special, Capacity 40,000#, 6" dial. 18 other models for every drilling, well servicing or work-over need.

With a Line Scale you know the pull on the line, and the weight on the bit in pounds. Accurate, sensitive, rugged and economical.

Line Scales are dependable, even in areas of rapid temperature changes. Repeated tests prove the accuracy of Line Scale readings under all working conditions.

LINE SCALE CO., Inc.
Phone 2-1765, 907-11 SE 29th St., Box 4245
Oklahoma City, Oklahoma



Give tomorrow's work-over crew a break

. . . Leave the inside of the casing "clean as a hound's tooth" by running a BAKER CASING SCRAPER just above the bit when you drill out cement, or clean out after a perforating job. No tricks, no trouble.

BAKER Rotary CASING SCRAPER

ASK THE BAKER MAN

Sterling
PUMPS • HOISTS • LIGHT PLANTS

DEPENDABLE
RUGGED
SIMPLE
•
SAVE
MONEY
SAVE
TIME

For more detailed information see pages 3620 and 3621, Composite Catalog.

STERLING
MACHINERY CORPORATION
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QUICK REPAIRS ON
CONDENSER
and
HEAT EXCHANGERS

If you need condenser or heat exchanger repairs *in a hurry* call us. We specialize in fast, high quality work.

25 Years Successful Experience

GULF ENGINEERING CO., INC.
"Service, Not Promises"
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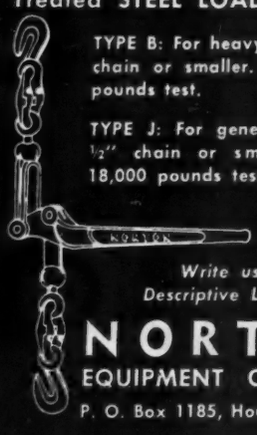
STRONGER BOOMERS
for SAFER HAULING

NORTON Drop Forged, Heat Treated STEEL LOAD BINDERS



TYPE B: For heavy hauling—⅜" chain or smaller. Over 30,000 pounds test.

TYPE J: For general hauling—½" chain or smaller. Over 18,000 pounds test.

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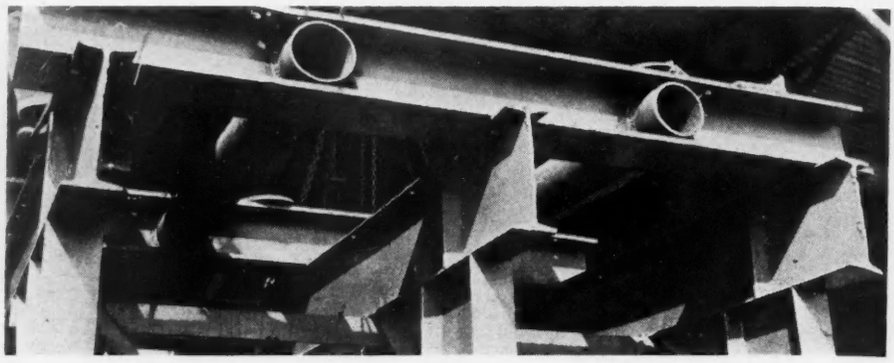
EQUIPMENT CO., INC.
P. O. Box 1185, Houston 1, Tex.

Reinforce I-Beams Added To Substructures



SUB-STRUCTERS

When it was found necessary to extend the height of the substructure on one rig, a drilling contractor used 12-inch I-beams and joined them together with salvaged pipe. Not having two joints of drill pipe, one joint of drill pipe and one joint of grade D casing was used. Channel irons were welded to the top of the substructure for tracks on which to mount the drilling equipment.

Before raising the I-beams, holes were cut at the proper places with a torch to admit the pipe. The pipes were then slipped through the holes and chained until they were hoisted up on the substructure. As soon as the middle beam was spotted in place and bolted, the other two beams were slid out and bolted in their proper place. The seams around each of the holes were then welded up to make a strong, rigid structure. This was all done in the company welding shop before the entire assembly was moved to location.

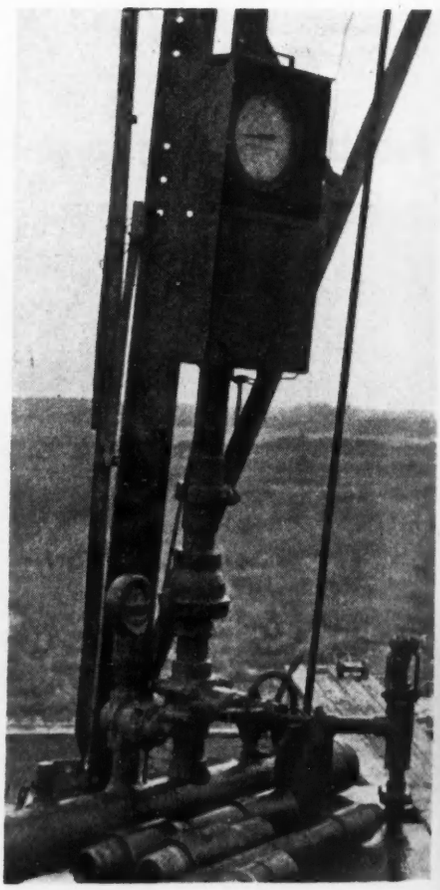
Speed Up Tearing Down and Setting Up Operations

RIG LAYOUT

Every moment saved in dismantling and rigging up a drilling rig represents money saved. One of the various short cuts used to unitize various assemblies is shown. The weight indicator is mounted on the drilling mud standpipe above a one-bolt union in such a manner that when the standpipe is taken down, the weight indicator is also removed by breaking out the same union. The weight indicator contains a compartment for packing the pressure element which fastens to the lead line, and a sliding front to protect the gage glass while in transit.

This assembly is further unitized by placing the mud pressure gage, relief line, and standpipe on one header leading from the mud pumps. By breaking out three unions, the entire assembly may be moved in one piece and reassembled at the next location.

Additional care must be exercised in breaking out the long nipple constituting the stand pipe due to the sensitive weight indicator attached near the lower end. As soon as the assembly has been dismantled and layed out on the derrick floor, the weight indicator accessories should be properly packed in the space provided in the protective metal case. This procedure will insure availability of all parts when the assembly arrives at the next location. The indicator should be mounted on the standpipe at such a height as to be visible from the driller's position.



Do Stabilizers *Ever* Wear Out?

Here's a case history that makes you wonder if they do:

★ One of our best known drilling contractors was having serious trouble with torque and vibration caused by unprotected drill pipe and tool joints rotating against the casing. It was impossible to get through the critical zone to the higher R.P.M. desired. After a study of the situation, the Drill Pipe Stabilizer, Code name: MOSS, was recommended for every joint of 4½" drill pipe inside the 11¾" casing. The MOSS has an installed O.D. of 8⅝".

After every joint of drill pipe was rubbered, good progress was made and all trouble vanished because the casing was 100% protected. Recently the 4½" pipe was laid down after being in the hole 7 months. Every Stabilizer measured 8⅝"... exactly the same O.D. as when installed... not even a fraction of an inch of wear. Every Stabilizer was full bodied, resilient and fit for drilling for a long time to come.

If Patterson-Ballagh Drill Pipe Stabilizers ever wear out they take a long time to do it. This means you can rubber your string at a very low cost compared to the great savings you make in casing and drill pipe wear, power loss, drilling time and rig strain. Start putting these savings in your profit pocket now... have your string rubbered 100% right away.

Specify **PATTERSON-BALLAGH**

DIVISION OF BYRON JACKSON CO.

"Best Bet Yet!"

DRILL PIPE STABILIZERS

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★ 6247 Navigation Blvd.
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★ 808 Graybar Bldg.
New York 17

★ 931 Russ Bldg.
San Francisco 4

Crude Production Hits High for Year, Bringing Gain in Refinable Stocks

A new high for the year in crude production was reached in the week ending April 12, according to The American Petroleum Institute. As a result of this production hike and a slowdown in refining activity, considerable material was sent to storage, bringing refinable crude stocks to the highest point since the middle of 1944.

Daily crude production during the week ending April 12 averaged 4,913,000 barrels after increasing 21,000 barrels from the previous week's daily output. Compared with last year's like period that was an increase of 222,000 barrels or 4.7 percent daily. Although a new high for this year, that was still 48,000 barrels a day under the all-time production high set in the middle of last year.

The refining part of the industry used 4,667,000 barrels daily during the week, a drop of 105,000 barrels a day from the past week's daily runs to stills, but an increase of 37,000 barrels daily over the period a year ago.

According to the Bureau of Mines, stocks of refinable crude totalted 230,401,000 barrels on April 5, to show an increase of 2,872,000 barrels during that week. Those stocks were 9,187,000 barrels or 4.2 percent higher than those held a year previously and represented the highest point stocks had reached since June 17, 1944, when they amounted to 230,565,000 barrels.

Production of gasoline, which included natural blended, was cut back 284,000 barrels from the previous week to total 14,090,000 barrels, which was still 1,039,000 barrels or 8 percent more than was produced in the like week of last year. Withdrawals totaling 745,000 barrels were made from stocks of finished and unfinished gasoline during the week, reducing them to 106,221,000 barrels. Those stocks were 4,103,000 barrels or 4 percent more than were being held a year previously.

The week's refinery output of distillate fuel oil amounted to 5,499,000 barrels, a decrease of 154,000 barrels from the previous week's production, but 119,000 barrels or 2.2 percent more than was produced in the corresponding period of 1946. Considerable demand for these light heating oils continued and it was necessary to withdraw 339,000 barrels from stocks, which reduced them to 32,019,000 barrels by the week's end.

The only principal refinery product whose production was upped during the week of April 12 was residual fuel oil. Output for the week of 8,232,000 barrels represented an increase of 26,000 barrels over the previous week's production, but a decrease of 175,000 barrels or 2.1 percent from output of last year's like period. Residual stocks, after building up several weeks, slipped back 595,000 barrels to 42,946,000 barrels.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.
(All Figures in Thousands of Barrels—Add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1945	4,944	7-21	[1]5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	[1]4,961	6-15	4,968	12-28	229,430	3- 2	105,233	2-16	[1]67,286	11- 9	61,636	11- 2
1947	4,913	4-12	4,986	3-15	230,401	4- 5	107,576	3-29	58,034	1- 4	53,285	1- 4
Lows:												
1945	3,621	10- 6	3,409	10- 6	[2]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,403	3- 9	4,498	1-12	218,193	1- 5	85,324	9-28	25,131	3- 9	37,289	4- 6
1947	4,531	4-11	4,737	2-15	220,313	2- 8	94,882	1- 4	32,019	4-12	42,703	3-22

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,923	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,477
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 25	4,672	4,820	221,655	14,624	99,801	5,630	50,357	8,224	48,558
February 22	4,786	4,860	224,580	14,668	103,904	5,929	40,739	8,542	44,919
March 29	4,865	4,843	227,529	14,396	107,576	5,969	32,737	8,668	43,364
April 5	4,892	4,772	230,401	14,374	106,966	5,653	32,358	8,206	43,541
April 12, 1947	4,913	4,667	.....	14,090	106,221	5,499	32,019	8,232	42,946
April 13, 1946	4,691	4,630	[3]221,214	13,051	102,118	5,380	31,202	8,407	37,767
Change:									
In Week	+21	—105	+2,872	—284	—745	—154	—339	+26	—595
In Year	+222	+37	+9,187	+1,039	+4,103	+119	+817	—175	+5,179
In Year	+4.7%	+0.8%	+4.2%	+8.0%	+4.0%	+2.2%	+2.6%	—2.1%	+13.7%

[1] All time peak. [2] Lowest since December, 1921. [3] Stocks, April 6, 1946.

Prices of Refined Products Remain Generally Unchanged

A 25 cents per barrel price increase for western Ontario crude by Imperial Oil Limited was announced last week. Refined product prices remained generally unchanged and firm throughout the U. S. as strong demand for all products continued. Strongest in tendency for higher prices were the heavy fuel oils, with raises being made in several areas and others considered.

Imperial Oil Limited announced an increase of 25 cents per barrel in the price that it will pay for western Ontario crude, retroactive to March 10. New prices are $2.67 a barrel for Oil Springs and $2.60 for Petrolia, Bothwell and Glenco crudes. This adjustment was the first for these crudes since the 25-cent increase made by Imperial on December 16, 1942.

No. 6 fuel oil was raised 5 cents on the low in Kansas to $1.65 at the week's outset, and on the following day those refiners quoting this price raised it another 5 cents to $1.70. However, one Kansas refiner has continued to ask $1.75.

The only product price change in the midwest was a 5-cent increase to $1.60 per barrel in Group 3 quotation for No. 6 fuel by one refiner. Suppliers at New York harbor reported increases in their prices for No. 5 fuel were being considered, but there were no indications that action would be immediate. This considered increase amounted to 10 cents per barrel, but more recent reports indicate that a raise is not believed justified as yet. Postings of majority of suppliers at the harbor for 0-10 pour No. 5 fuel were unchanged at $2.57, while several others posted $2.67.

A reduction of ½ cent per gallon in its tank wagon prices for all grades of gasoline throughout Texas, effective April 12, was announced by The Texas Company. This cuts half off the 1-cent increase Texaco made in its wholesale prices in Texas on March 21, shortly after the crude price hike.

• Oklahoma

796 Feet of Drill Pipe Left In Caddo County Record Well

Nearly half of stuck drill pipe at world's deepest well recovered in less than a week; Magnolia again finds deep pay in Chitwood pool of Grady County; Logan County wildcat opens new gas-distillate pool; shallow producing horizon found in old Altus pool; Cities Service stakes wildcat in Garvin County; second Viola lime producer in North Lindsay pool is being tested.

Caddo County: The deepest fishing job ever attempted has proven remarkably successful so far, with nearly half the total footage of stuck drill pipe recovered in less than a week of operations. The well is The Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, 5 miles north of Fort Cobb. Of the 1500 feet of drill pipe left in the hole after crews successfully cut pipe, 704 feet had been recovered from April 8 to April 14, leaving 796 feet on bottom. Company crews are continuing washing over remainder of the pipe in an effort to recover the string so that drilling operations can be resumed. Total depth of the well is 17,236 feet, world's deepest.

Grady County: Magnolia Petroleum Company has hit deep pay again in the Chitwood pool, southwest of Alex. Boatwright 1, NW SE NE 33-5n-6w, was flowing 46 barrels of oil per hour through tubing choke from perforations at 11,340-50 feet. Total depth is 11,418 feet. The well is a north offset to the discovery, Magnolia's Cunningham 1, CSE SE 33-5n-6w, which opened gas-distillate production from perforations at 10,879-82 feet 2 years ago. First production from the deeper pay was brought in by the company at Spiers 1, CSW SW 28-5n-6w, northwest of the new well, which perforated the pay at 11,720-36 feet.

Logan County: A gas-distillate pool in the southeastern portion of the county has been opened by Jordan Petroleum Company and associates. Porter 1, NE SE SE 30-16n-1e, cleaned out and is estimated good for as high as 50,440,000 cubic feet of gas, with 50 to 100 barrels of distillate per day. The new well is about 2 miles west of the Meridian pool and about the same distance northeast of the Evansville pool. The well was shut in due to bad weather when the flow had cleaned. Operators will move in separator and tanks when roads permit. Bartlesville sand was had at 4871-81 feet, with casing set at 4873 feet. When plug was drilled the well started heading and kicked off when tools were pulled. The well showed wet gas on a drill-stem test before casing was set. There are no near by dry holes to define the area, although both the Meridian and Evansville pools have only a few commercial producers.

Jackson County: A shallow producing horizon on the northwest end of the old Altus pool apparently has been opened by Collins Oil Company and associates. Beuser 1, in 4-1n-20w, on a lease farmed out by The Texas Company, found sand at 1372-74 feet, and hole started filling with oil. Operators are installing pumping equipment. The unidentified sand (Pennsylvanian series) is above granite wash, the producing zone of the Altus field.

Garvin County: The Garvin-McClain County trend holds the spotlight in Oklahoma oil operations, with many new wildcats started in the search for oil and distillate. Cities Service Oil Company staked a 12,000-foot wildcat 4½ miles south of the East Lindsay pool, and southeast of Erin Springs, in the northwestern part of the county. The test, Rogers 1-B, SW NE SE 25-4n-4w, is on a Mid-Continent Petroleum Corporation lease, with Sinclair Prairie Oil Company holding offset acreage to the north. Nearest test drilled to the new location was a dry hole in 20-4n-3w, which was abandoned at 9218 feet. The Carter Oil Company has staked location on the west side of the Katie area for Stevenson 1, CSW NE 6-1n-1w.

McClain County: The second Viola lime producer for the North Lindsay pool has been brought in by Cities Service and associates, after plugging back from the Bromide zone. Von Wedel B-1, CNW NW 22-5n-4w, continued testing a 100-foot section of the higher pay before completion is made. Casing is set at 11,005 feet, plugged back to 10,920 feet. A total of 340 holes were perforated opposite the Viola lime from 10,780-880 feet. The well made 203 barrels of oil in 28 hours on swab test, with flow through 36/64-inch choke. Testing continued for several weeks in the Bromide zone where varying amounts of oil showed. The other Viola producer in the field is Frank Russell's Little 1, NE NW NE 22-5n-4w, which produces through perforations at 10,734-806 feet. A Plymouth Oil Company well, Gibson 1, SW SE SW 14-5n-4w, on the northeast side of the area, is producing from the Hunton lime.

• Kansas

Rush County Oil Pool Opened; Behrens Extension Try Fails

Oil pool opened in Rush County; attempt to extend Behrens pool to north fails; McPherson County well shows indications of extending Bitikofer pool to west; company retesting possible pool opener.

Rush County: An oil pool has been opened by Darby & Bothwell with Weizzell 1, SW NW 1-16s-20w. The well made 26 barrels of oil in the first hour and 10 barrels per hour for 5 hours on a swab test of production found in the sandy conglomerate, equivalent to the Gorham sand, topped at 3678 feet. Hole filled with 1200 feet of oil in the first 30 minutes after cement plug was drilled

Wells Completed in the United States in Week Ended April 12, 1947

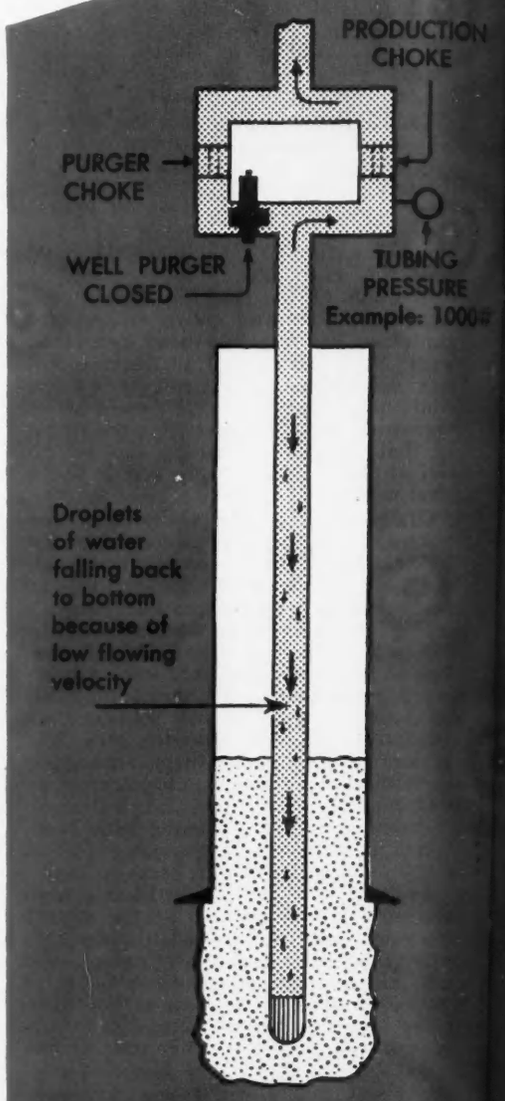
Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*In-put	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Alabama	....	....	....	....	....	....	....	....	....	....	1	1	1	....	....
Arkansas	3	....	....	....	1	4	....	....	....	....	3	3	7	6	5
California	30	....	1	....	2	33	1	....	....	....	3	3	37	53	28
Colorado	4	....	....	....	....	4	....	....	....	....	....	....	4	3	....
Florida	....	....	....	....	....	....	....	....	....	....	1	1	1	1	....
Illinois	20	....	....	....	8	28	1	....	....	....	4	4	33	32	44
Indiana	5	....	2	....	5	12	....	....	....	....	....	....	12	22	7
Kansas	19	....	4	1	8	32	2	....	....	....	3	3	37	50	30
Kentucky	2	....	2	....	2	6	....	....	....	....	....	....	6	17	14
Louisiana	14	1	1	....	4	20	....	....	....	....	3	3	23	30	22
N. Louisiana	5	....	1	....	3	9	....	....	....	....	2	2	11	13	10
S. Louisiana	9	1	....	....	1	11	....	....	....	....	1	1	12	17	12
Michigan	1	....	....	....	1	2	....	....	....	....	....	....	2	9	15
Mississippi	3	....	2	....	2	7	....	....	....	....	1	1	8	5	2
Montana	2	....	....	....	....	2	....	....	....	....	....	....	2	2	4
New Mexico	3	....	1	....	....	4	2	1	....	....	1	2	8	11	7
New York	14	....	....	16	....	30	....	....	....	....	....	....	30	25	27
Ohio	2	....	10	....	10	22	....	....	....	....	1	1	23	26	9
Oklahoma	29	....	4	....	15	48	2	2	....	1	7	10	60	83	33
Pennsylvania	27	....	5	15	2	49	....	....	....	....	....	....	49	47	48
Texas	98	4	5	3	21	131	7	5	2	....	20	27	165	179	153
Districts:															
1—S. Central	2	....	....	....	1	3	....	....	....	....	2	2	5	5	4
2—Middle Gulf	9	....	....	....	1	10	....	2	1	....	1	4	14	11	1
3—Upper Gulf	7	3	1	....	2	13	....	....	....	....	3	3	16	16	16
4—L. Gulf-S.W.	12	1	1	....	6	20	1	....	1	....	3	4	25	19	29
5—E. Central	....	....	....	....	....	....	....	....	....	....	....	....	....	4	2
6—Northeast	5	....	2	....	1	8	....	....	....	....	3	3	11	14	15
7-B—N. Central	5	....	....	....	2	7	1	1	....	....	4	5	13	24	3
7-C—W. Central	4	....	....	....	1	5	....	2	....	....	....	2	7	2	4
8—West	30	....	....	....	1	31	3	....	....	....	1	1	35	32	38
9—North	19	....	....	3	4	26	2	....	....	....	3	3	31	42	44
10—Panhandle	5	....	1	....	2	8	....	....	....	....	....	....	8	10	7
West Virginia	2	....	5	....	1	8	....	....	....	....	....	....	8	14	14
Wyoming	2	....	....	....	....	2	....	....	....	....	1	1	3	1	....
Total U. S.	280	5	42	35	82	444	15	8	2	1	49	60	519	616	462

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S. W. [2] East Central included with Northeast. [3] N. Central included with North. [4] West Central included with West.

Here's how the "OMSCO" WELL PURGER (PATENTED) works . . .

If your well makes water ... you need it!


PRODUCTION CHOKE
PURGER CHOKE
WELL PURGER CLOSED
TUBING PRESSURE
Example: 1000#
Droplets of water falling back to bottom because of low flowing velocity
WELL FLOWING ON PRODUCTION CHOKE AT RATE OF DAILY ALLOWABLE

Study the four sketches at the right — they illustrate the complete cycle of the action of the "Omsco" Well Purger.

By the use of this automatic purger, the flowing life of a well is lengthened—manual purging is never required—expensive swabbing jobs eliminated.

One swabbing job costs more than an "Omsco" Well Purger.

Thoroughly proven on hundreds of wells.

Contact your nearest Wilson Supply Store or write.

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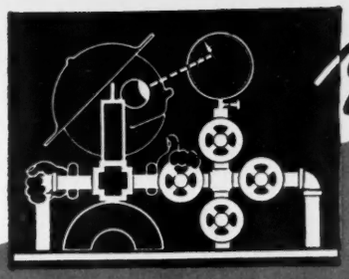
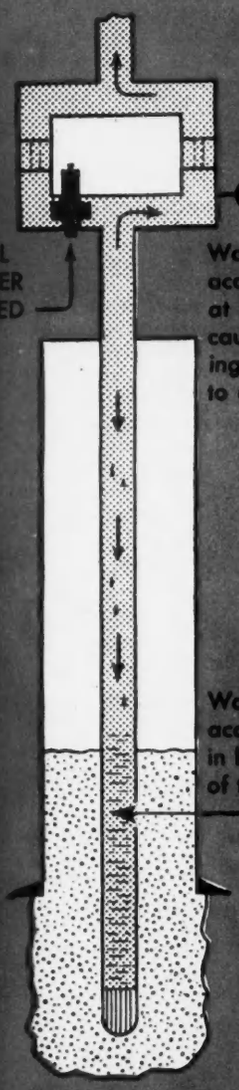
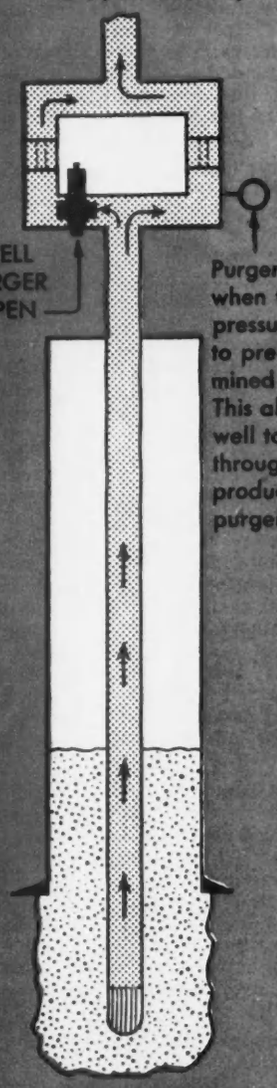


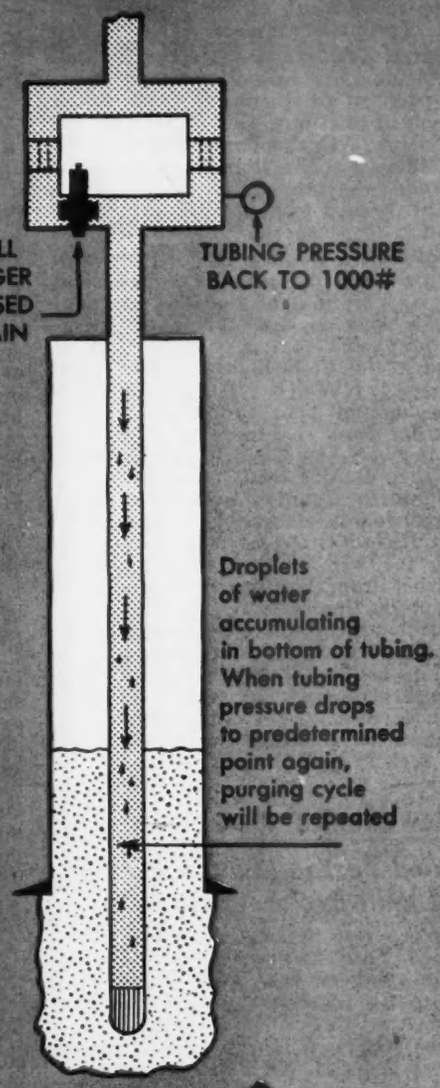
Your MECHANICAL SWITCHER


WELL PURGER CLOSED
Water accumulating at bottom causes tubing pressure to drop
Water accumulating in bottom of tubing

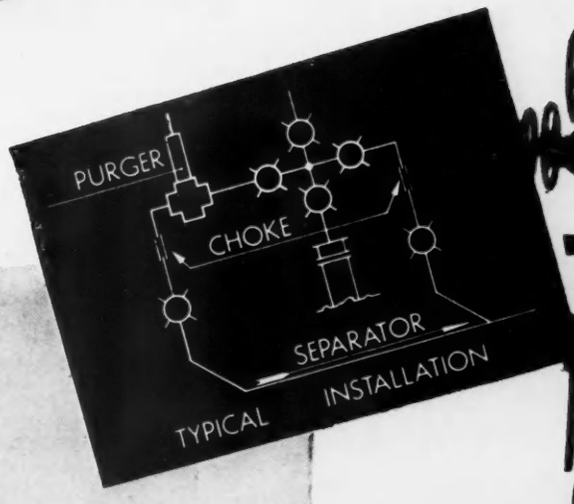
WELL LOADING UP WITH WATER


WELL PURGER OPEN
Purger opens when tubing pressure drops to predetermined point. This allows well to flow through both production and purger chokes

WELL PURGER OPENS
Flow velocity in tubing increases, which carries accumulated water out of well


WELL PURGER CLOSED AGAIN
TUBING PRESSURE BACK TO 1000#
Droplets of water accumulating in bottom of tubing. When tubing pressure drops to predetermined point again, purging cycle will be repeated

WELL FLOWING ON PRODUCTION CHOKE AT RATE OF DAILY ALLOWABLE



The small drawing to the right shows the simplicity of installing the "OMSCO" Well Purger. Once installed—no further attention or adjustments are required.

out, and 2000 feet in 1½ hours. The test is 3½ miles south of the Penny-Wann pool. Testing continued.

Barton County: An attempt by Bay Petroleum Corporation to extend Behrens pool oil production ½ mile north has ended in failure. Geil 1, SE SW SE 30-19s-15w, was abandoned as a dry hole at 3718 feet in the Arbuckle lime. Gas-cut mud was recovered in a drill-stem test at 3660-85 feet, but only mud was found at 3685-99 feet.

McPherson County: A good possibility that Mallard Drilling Company and associates will extend the Bitikofer pool ½ mile west appeared likely, as operators prepared to test a good show of oil found in the Viola lime at 3357-60 feet. Wenger 1, NW NE NE 2-20s-1w, is ½ mile west of chat production in the Bitikofer pool. A 3-foot saturated core was recovered, and 5-inch pipe has been cemented at 3357 feet.

Ellsworth County: Sohio Petroleum Company was retesting its Horejsi 1, NW NW NE 12-16s-11w, hoping to bring the well in as a commercial oil producer from Lansing lime. Commercial production was not found in the Arbuckle, though there were good showings. The well is 1½ miles west of production in the Stoltenberg pool. The Horejsi was swabbing a barrel of oil and a barrel of water per hour through perforations. Lansing was topped at 3010 feet.

• New Mexico

Second Test in Lea County Pool Will Explore Yeso

Second test in Lea County pool to explore Yeso section; Chaves County wildcat plugged back from Pennsylvanian to try for completion in Permian oil zone.

Lea County: The Texas Company's Garrett 1, C NE SE 22-16s-38e, second small San Andres oil strike this year in the northeastern part of the county, pumped 15 barrels of 27-gravity oil and 15 barrels of water initial. Production is from perforations at 5300-400 feet and 5415-525 feet and open hole at 5540-690 feet. Total of 18,000 gallons of acid was used. Texas' State 1-A-K, 1¼ miles northwest, entered the San Andres at 4970 feet, with elevation 3730 feet, correlating 16 feet low, and was drilling lime at 5386 feet. It will explore the Yeso section regardless of results obtained from the San Andres.

Chaves County: Honolulu Oil Corporation, Martin Yates, Jr., and Continental Oil Company's Mullis-Federal 1, C SE SW 21-15s-29e, made an unsuccessful try for production below the Permian in drilling to 10,033 feet in Pennsylvanian lime. The hole has been plugged back to 3800 feet to try for completion near the 3100-foot level. The Hueco, or Basal Permian beds, was entered at 7150 feet, with elevation 3809 feet.

Richfield Oil Corporation's White 1, C SE SW 6-12s-29e, projected Ellenburger wildcat, was drilling lime at 3910 feet. Cores taken several hundred feet above showed formation dip of 5 to 7 degrees. The San Andres was entered at 1870 feet, and solid lime at 2630 feet, with elevation 3710 feet. Richfield has drilled 2 tests to granite in Chaves County, and shared the cost of other failures in its attempt to discover a deep producing area.

• West Texas

Crane County Test Has 225 Feet of Ellenburger Pay

Crane County multi-pay discovery has in excess of 225 feet of Ellenburger oil zone without water; Devonian sector of TXL field extended northwest; southeast extension due for Wheeler area; Crockett County has prospective oil discovery.

Crane County: Gulf Oil Corporation's University 1-HH, 3¾ miles north by east of the Block 31 2-pay field and a separate structure, qualified for rating as one of the important sweet crude discoveries in logging 262 feet of Ellenburger broken pay section in drilling to 10,850 feet without water. It will be deepened 50 feet. Last drill-stem test yielded a flow of 69 barrels of oil, with gas-oil ratio of 696/1, in 1 hour from bottom 51 feet. Test at 10,685-750 feet showed a rated flow of 72 barrels of 45.5-gravity sweet crude hourly. The Ellenburger was entered at 10,588 feet by corrected measurement, and first effective pay is near the 10,625-foot level. Four other zones below the Permian indicated possible production. Gulf assumed an Ellenburger test obligation in paying $422,000 cash for its 1600 acres of University leases, and owns all acreage immediately north of the 320-acre drilling site. The area is to be called the University-Waddell field, and a 6-inch pipe line outlet is under way. Rate of development depends upon the availability of casing.

The Texas Company's Connell 31, Ellenburger prospect near the north line of the county and 3 miles west by south of the Jordan-Ellenburger area, tested a show of gas with 60 feet of free oil when a drill-stem test was made of Lower Clear Fork saturation at 6938-60 feet. Previous tests higher in the zone and the Glorietta showed water with oil. The company is starting a Clear Fork test 2 miles south.

Yoakum County: The Texas Company's Samuels 1, C NE NW Sect. 242, Block D, 8¾ miles southwest of the Landon field, nearest production, swabbed 38 barrels of fluid, including 50 percent black dead oil and the remainder basic sediment and salt water, on 24-hour test. This production is from perforations at 5295-315 feet in San Andres, topped at 4510 feet with elevation 3804 feet. Perforations will be made higher in the section. This showing will warrant further explorations in the area.

Coke County: Sun Oil Company's H. H. Jameson 1, west offset to its Jameson field discovery, was idle for rig repairs at 6190 feet after testing wet gas at the rate of 8 million cubic feet daily at 5941-6110 feet and flow of 43-gravity oil through tester at 6112-50 feet. The Crinoidal was entered at 5941 feet, with elevation 2091 feet, correlating 270 feet high. Top of the oil zone correlates 124 feet high. This reveals that more than half the structural relief consists of a gas-cap zone. Sun's Fred Jameson 1, south offset to the discovery and a failure in the Ellenburger at 7045-130 feet, flowed 248 barrels of 47-gravity oil natural through ¼-inch choke initial from 3 zones of perforations, aggregating 148 feet, between 6165-345 feet. The discovery was drilled only 20 feet in the pay as safeguard against water, and will be deepened.

Crockett County: Ted Weiner et al's Vaughn-Richfield 1, C SW SE GC&SF Ry. 86, Block OP, projected Ellenburger test and 7¼ miles east of the Todd-Ellenburger field, nearest active production, cemented 8⅝-inch casing at 1997 feet to perforate and test opposite San Andres saturation at 1523-35 feet.

Shell Oil Company's University 1, C NW NW Sect. 21, Block 39, was making a swabbing test after tester yielded 5610 feet of gas-cut mud at 8497-8660 feet in Ellenburger, topped at 8040 feet with elevation 2572 feet. This wildcat showed gas in the Upper Ellenburger, but the volume declined sharply.

Cities Service Oil Company, Plymouth Oil Company and Humble Oil & Refining Company's Owens 1-B, prospective oil discovery between the Clara Couch and Olson shallow areas, was drilling lime at 6195 feet. A late drill-stem test at 5777-838 feet yielded 1165 feet of slightly oil- and gas-cut mud and 1980 feet of water from Crinoidal, topped at 5618 feet. Tests made higher in the section registered a prolific flow of oil and gas. This may be a significant discovery, while the outlook for Ellenburger production is considered good.

Ector County: Shell and Arkansas Fuel Oil Company's Slater 2-D, NW NE T&P Ry. 1, Block 46, set pipe for completion after extending the Devonian sector of the TXL field ⅝ mile northwest in flowing at the rate of 70 barrels of oil hourly through tester from chert at 7970-8065 feet. The Devonian was entered at 7965 feet, with elevation 3355 feet, and correlates 90 feet low to nearest production. Several questionable locations will be drilled promptly as a result of this showing.

The Texas Company's TXL 2-D, C NW SW T&P Ry. 27, south offset and second producer for the Southeast TXL-Ellenburger area, flowed 165 barrels of oil and water load during first 1½ hours after starting test of Ellenburger pay at 10,744-864 feet. This involves production from the downdip side of the fault that slices the southeast portion of the TXL field.

Gulf's Goldsmith 421-E, Goldsmith field's Devonian-pay discovery, flowed 121 barrels of 37.3-gravity oil, with gas-oil ratio of 555/1, initial through 9/64-inch choke after flushing perforations at 7980-90 feet with mud acid. Regular acid treatment is scheduled now that water has been exhausted.

Stanolind Oil & Gas Company-Shell's Wheeler 1-F, ½-mile southeast outpost for the Wheeler field, showed probable production in recovering 2880 feet of oil- and gas-cut mud when tester was used at 8268-8355 feet in Devonian, topped at 8320 feet, or 24 feet low. It was drilling at 8465 feet.

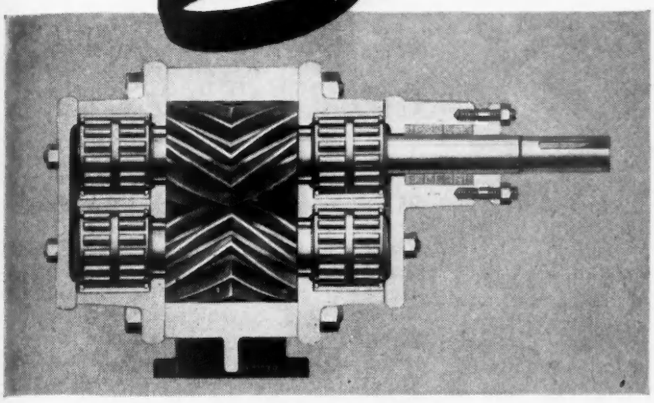
Midland County: Humble's Floyd 1, 3¾ miles southeast of the Midland 2-pay field, was preparing to acidize Devonian open hole at 11,195-210 feet after failing to indicate commercial production by swabbing. Rig has been skidded ½ mile east for a new Devonian test.

Midstates Gets Leases

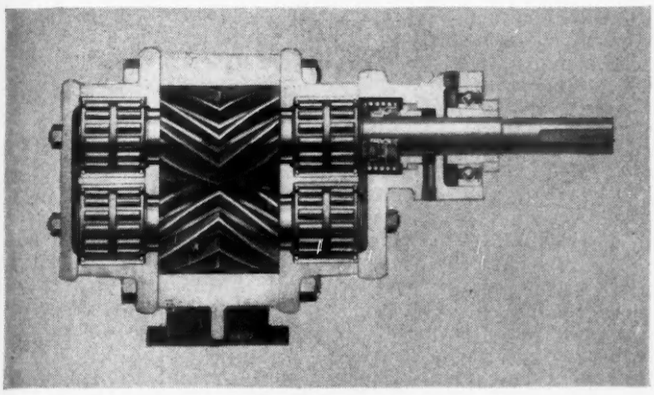
Midstates Oil Company paid the top price for a 40-acre lease at the recent sale of oil and gas leases of restricted lands of the Five Civilized Tribes at Muskogee, Okla. The company paid $12,502, or $312.55 per acre, for the W/2 SW NW and W/2 NW NW of 17-3n-5w, in Grady County—only tract in that county offered.

3 PUMPS YOU CAN INSTALL ...and forget

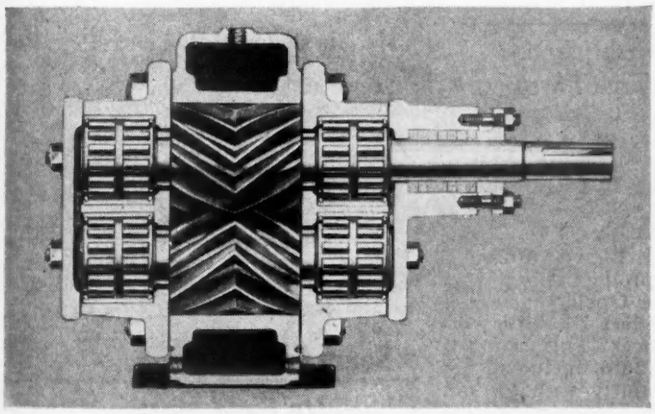
... Worthington Rotary Pumps Have Built-In "Performance Insurance"



Longitudinal section through standard GR type rotary pump.



Longitudinal section through GRMI type rotary pump provided with mechanical bellows-type seal and inboard bearing for overhung drive.



Longitudinal section through GRJ type rotary pump incorporating steam jacket for pumping asphalt . . . tar . . . grease . . . petroleum jelly etc. Special water jacketed stuffing box is provided for operating temperatures exceeding 350° F.

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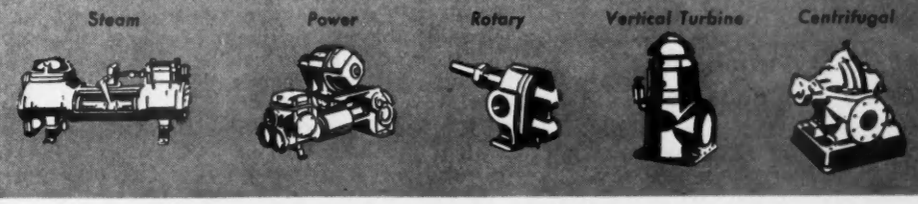


• North Texas

District's Record-Depth Well Plugs Back for Strawn Tests

District's record-depth well test Strawn after failing to reach Ellenburger; Young County field expanded northeast with shallow-pay discovery; wildcat in Montague County show for small producer.

Grayson County: Denver Producing & Refining Company's Rich 1, Wm. McGill Survey and 3 miles southeast of the Handy pool, failed to reach the Ellenburger in drilling to 13,352 feet in shale, and has plugged back for test of several promising Strawn sand shows. Perforations at 9800-20 feet yielded water, while later perforations at 8870-8940 feet tested fresh water. Most promising oil showing was logged at 8900-20 feet.

Collin County: Humble Oil & Refining Company's Wester 1, a mile south of Weston, was drilling at 7695 feet in Ellenburger, topped at 6830 feet, and is scheduled to drill through this zone for possible production in the Cambrian.

Young County: Warren Oil Corporation's Dent 1, southwest corner of Sect. 720, TE&L Company Survey, and ⅝ mile northeast of its discovery for the Holbert-Caddo field, flowed 26 barrels of oil natural on 21-hour gauge through 24/64-inch choke from Strawn sand at 2963-68 feet.

Childress County: Amerada Petroleum Corporation is starting Middleton 1, with plans to drill to the Ellenburger. This prospect is several miles northeast of Watchorn-Alma Oil Company's Low 1, which swabbed and flowed oil near the 5600-foot level in 1936, and later was abandoned after deepening to Ellenburger at 8223 feet.

Montague County: Continental Oil Company's Magee 1, C. A. Wright Survey and 3 miles southeast of Montague, swabbed 2 barrels of oil hourly on 16-hour test of conglomerate open hole at 6460-90 feet, and was due to be given a light nitro shot. This wildcat entered the Bend at 6228 feet, and was drilled to 6640 feet. Oil-saturated sand in the Strawn at 6018-40 feet affords the best prospects for commercial production.

Eason Oil Company's Yarbrough 2, F. J. Bellows Survey, scored the third producer for the South Bowers field in flowing 115 barrels of oil natural on 9-hour gauge from Strawn at 4018-28 feet. S. D. Johnson and Acme Die & Machine Company's Hodges 2, Sam Epps Survey, was running pipe to test broken saturation at 3930-87 feet. R. S. Hays, Newman Bros. and Skinner & Eddy Corporation's Flannery 1, J. C. Jones Survey, and North American Oil Consolidated's Hodges 1, Epps Survey, appeared doubtful for production.

Wilbarger County: Humble Oil & Refining Company's McCaleb 6, SE NE H&TC 34, Block 15, projected Ellenburger test for the Fargo field, was drilling at 5370 feet after recovering 45 feet of oil and gas-cut mud with show of free oil when tester was used at 5270-83 feet.

Strict Conservation Laws Asked by Stripper Group

Enactment and adequate enforcement of effective oil and gas conservation laws in all producing states was urged in resolution adopted at joint meeting of the Stripper Well committees of the Interstate Oil Compact Commission, the Independent Petroleum Association of America and the National Stripper Well Association last week in St. Louis.

The Compact Commission and its individual members were asked to use their best efforts in urging all oil producing states not having effective conservation laws to enact such legislation immediately as the best means of solving the stripper well problem.

The Compact's stripper well committee accepted the responsibility of coordinating and spearheading the work of all three groups. In conducting the survey the following facts will be developed:

1) Stripper well pools in each state, productive acreage and approximate number of stripper wells in each pool. 2) Reserves involved including reserves recoverable with present known methods of primary and secondary means and also the residual reserve. (This information would be supported by all available engineering data). 3) Statistics on abandoned wells. 4) Current production from stripper well areas. 5) Relative production costs of primary, secondary and stripper production. 6) Relationship and importance of stripper well industry to the community interest and national welfare. 7) Quality of crude oil underlying stripper well reserves.

Don T. Andrus, Bradford, Pa., chairman of the Compact's stripper well committee, was named chairman of the joint session.

Members of the three committees were asked to attend the Secondary Recovery Forum in Washington May 15. Members, on May 16, will meet with the Army and Navy Petroleum Board to discuss promotion of secondary recovery research in various institutions in oil producing states.

• East Texas

Oil Production Established On Opelika Southwest Flank

Oil production extended to southwest flank of the Opelika gas-distillate field; Kemp townsite prospect correlates flat with near-by failure; Wood County wildcat nearing Paluxy zone.

Henderson County: Gulf Oil Corporation's Laco 1, John M. Flowers Survey, established first oil production on the southwest side of the Opelika gas-distillate field, and 8700 feet southwest of the nearest oil producer. This outpost flowed 13 barrels of fluid, including 18 percent acid water, hourly with gas-oil ratio 747/1, through 5/16-inch choke after acidizing Rodessa perforations at 8756-8805 feet. When reacidized with 8000 gallons the well flowed 8 to 10 barrels of oil and acid residue hourly through 5/64-inch choke. The oil tests 45-gravity. Ten flowing wells have been completed within the past 13 months along the north and northwest flanks of the large gas-distillate producing structure, but at such intervals that the width of the oil zone remains undetermined. Considerable development is scheduled for the area confirmed for oil. The wells average 15 feet of perforations opposite the Rodessa saturation.

Kaufman County: Humble Oil & Refining Company's Guy 1, projected Smackover test for its large Kemp faulted structure lease block, was drilling in the top of the Rodessa series at 5670 feet. Geological markers correlate flat with the company's 6475-foot failure situated 4300 feet southwest.

Wood County: R. J. Caraway et al's Mullinax & Martin 1, Mary Polk Survey and near the center of the east line of the county, was drilling at 7305 feet, having entered the Georgetown at 6150 feet and Fort Worth lime at 6980 feet with elevation 471 feet. It is unusually high for the area, as a 7515-foot failure by Algord and Snowden quit in the Woodbine.

Humble's Little Sandy Club 1, west side of the Hawkins field, was drilling sandy-shale at 9320 feet, while its McKnight 1, northeast edge of the field, was drilling at 12,345 feet on a Smackover objective. Shell Oil Company's Goldsmith 12, Smackover test for Quitman field, was drilling at 11,100 feet.

Harrison County: Arkansas Fuel Oil Company and Southern Production Company, having set production casing to 6602 feet in M. C. McCauley 1, wildcat in the P. Dougherty Survey, 3 miles east of Scottsville, were preparing to perforate for production tests. McCauley 1 is a prospective Travis Peak field opener which has had excellent shows of 40-gravity oil. Total depth is 6785 feet.

Another possible Travis Peak discovery is also preparing to test. E. C. Johnston's Edna Hood 1, Lucinda Wallace Survey, 12 miles east of Marshall, in the Cross Roads area, will test a promising open hole zone at 6415-30 feet and later perforate to test a section at 6275-85 feet. Pettit gas shows from 6165-75 feet also may be tested. Total depth is 6475 feet, with 5½-inch casing cemented at 6415 feet.

Shelby County: Humble Oil & Refining Company has staked E. Fleming et al 1, John Hailey Survey, 2810 feet northeast of the 1-well Huxley field. Efforts to extend the field southwest failed last year and interest switched to the east side of the field.

Marion County: Magnolia Petroleum Company's Hall Estate 1, M. W. Moody Survey, second test for the Lassater field, is continuing tests of perforations from 8762-72 feet. Operators think tests indicate that attempts to shut off salt water may have been successful, and that after a number of squeeze jobs and plug backs, Travis Peak production may be found at that level. The field discovery well produces from 7568-77 feet, at the top of the Travis Peak, and flows oil and water.

• South Central Texas

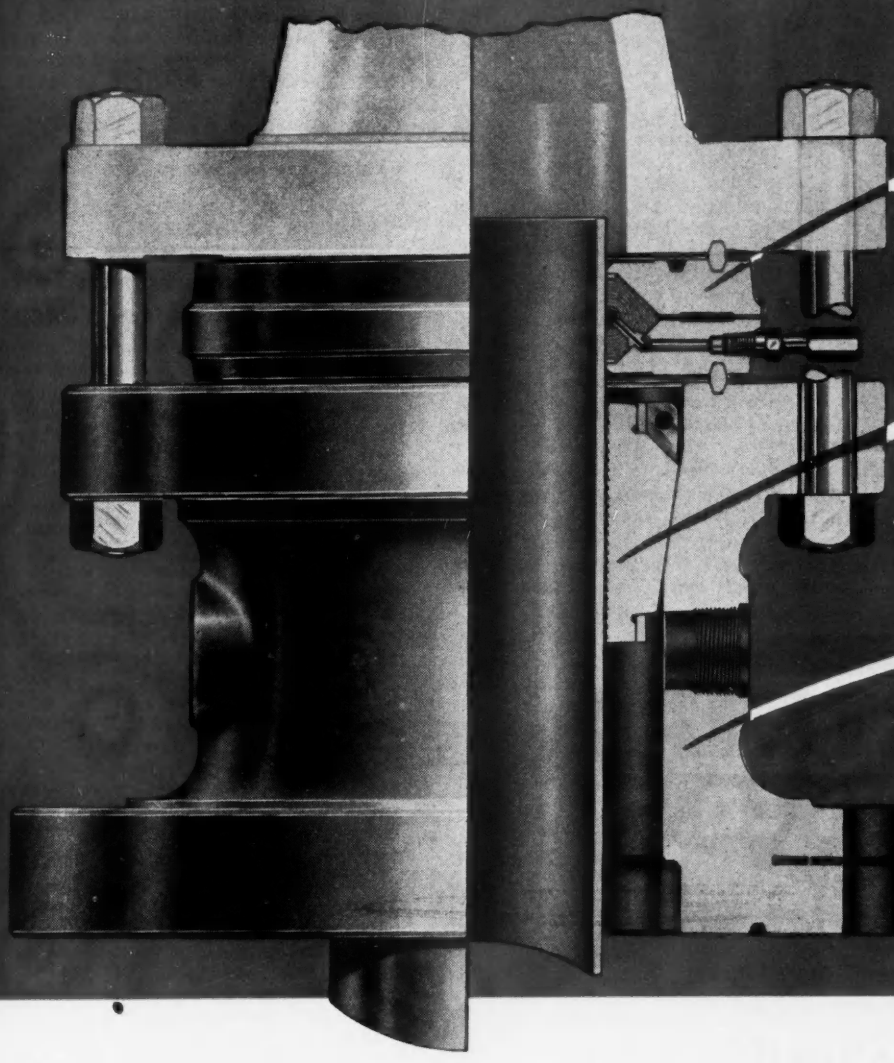
Charlotte Field Northeast Extension Given Potential

Mile-and-a-half northeast extension at Charlotte given potential; Holman well testing on the pump; Medina County wildcats testing on pump.

Atascosa County: Humble Oil & Refining Company's J. B. Henry 1, 1½-mile northeast extension test at Charlotte field, has been completed for a potential of 43½ barrels of 37.8-gravity oil daily, the flow being agitated with the pump. Tubing pressure varied from 0 to 300 pounds and casing pressure from 400 to 1000 pounds. Total depth is 5245 feet with 5½-inch casing set to 5150 feet, completion being from open hole and perforations at 5141-50 feet.

Edwards County: J. O. Rogers Oil

This is the New CAMERON *Forged Steel* CASING HEAD



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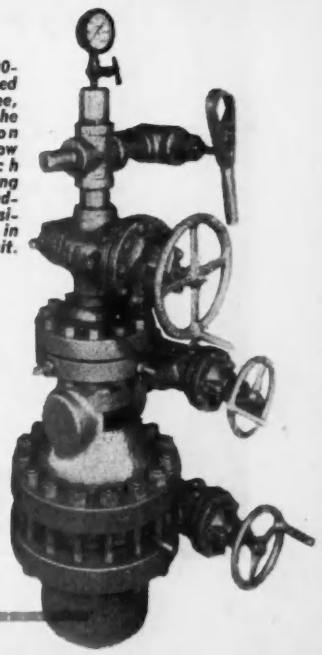
The Type "F" Casing Spool shown above is press *forged* from alloy steel to produce a leak proof, high-tensile strength product, yet the unit is priced economically in keeping with the market for which it was designed.

The seal flange is an innovation in casing seals. Note in the cutaway view that it bolts down between the casing head and tubing head flanges, utilizing flange bolt compression to force the packing ring into sealing engagement with the pipe. The seal flange is available with provision for hydraulic pressure testing, as shown, or plain. Its simplified design requires no special skill for installing—the operators own crew can perform this operation.

The *forged* steel slips, in six segments, provide dependable suspension for the casing string. The segments are contained in a cage, providing a two-piece slip that is easily assembled around the casing.

Pictured at right is a Cameron *all-forged steel* Christmas tree (except valves) assembled above a Type "F" Casing Head. Complete details on each unit of this assembly will gladly be sent to interested operators on request.



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Company's J. S. Holman et al 2750 feet southeast of the No. 1 discovery well at the new Holman field, is pumping and testing with 10 feet of 14-gravity oil in the hole. Total depth is 640 feet with 6-inch casing set to 430 feet. The same operator's Holman 3, in the same area, is drilling below 210 feet.

Medina County: John F. Camp & Sons' John F. Camp 1, wildcat 3½ miles southeast of Devine, pumped 4 barrels of oil daily and is still testing. Total depth is 2250 feet with 5½-inch casing set on bottom and perforated at 2240-50 feet in the Navarro sand. The John F. Camp 2, located 990 feet north of the No. 1 well, pumped 15 barrels of oil the first day, then quit. It is still testing. The No. 2 well is bottomed at 2620 feet and casing is perforated at 2194-2206 feet for completion.

Program Is Announced for PESA Annual Convention

Program for the annual meeting of the Petroleum Equipment Suppliers Association, May 4-7 in San Francisco, includes:

Open forum on sales accounting headed by a panel consisting of R. M. Morrison, general purchasing agent, The Texas Company and R. H. Hilborn, R. A. Schell, John H. Lollar, Jr., and A. B. Ripley, members of PESA's sales accounting committee. Frank Rhem, vice president and director of labor relations, Shell Oil Company of California, will discuss "Labor Relations."

Don Gilman, vice president, Western Oil and Gas Association, "Public Relations on the Part of Trade Association"; and Ray L. Dudley, president, The Gulf Publishing Company, "The Frequency of Publication of the Composite Catalog."

Reports of committees and election of directors and officers are scheduled May 7.

• Southwest Texas—Lower Coast

Davenport Field Oil Discovery Shows for Excellent Producer

Second well in Davenport gas-condensate discovery area tests 5 barrels of oil hourly; new discovery between Aviators and Dulup fields shows for production; new deep pay zone discovered at West Sinton; second well in new South Haldeman field flows oil on drill-stem test.

Starr County: Dee Davenport's Fee-State 2, oil discovery 2300 feet north-northeast of the No. 1 gas-condensate discovery well at Davenport field, showed on initial tests for an excellent producer. The well flowed an estimated 4 to 5 barrels of 48.6-gravity oil hourly on 9/64-inch choke with tubing pressure 365 pounds and casing pressure 500 pounds. Total depth is 4205 feet with 5½-inch casing set 1 foot off bottom and perforated at 4182-92 feet for the test. The Fee-State 1 was completed from perforations at 4098-4112 feet for a potential of 600,000 cubic feet of gas and 6.2 barrels of condensate daily, flow being through 9/64-inch choke.

Webb County: Dulaney Oil Company's Puig 22, discovery between Aviators and Dulup fields, has been completed on pump for a potential of 56½ barrels of 21-gravity oil daily. Total depth is 1823 feet with 5½-inch casing set 1 foot off bottom and perforated for completion at 1790-1800 feet.

San Patricio County: Jones & Morgan's A. L. Sims 3 has discovered a new deeper pay zone at West Sinton field. On completion the well flowed 168 barrels of oil daily through ⅛-inch choke with 550 pounds tubing pressure and 1000 pounds casing pressure. Total depth is 5186 feet with casing perforated at 5136-46 feet for completion. Deepest previous production in the field came from the 3460-foot level.

Jim Wells County: Magnolia Petroleum Company's Seeligson 7, Unit 4, in the new South Haldeman field, located a mile west of Seeligson field, flowed oil on drill-stem test and is a prospective producer. The test was run at 5564-72 feet and through ¼-inch chokes developed 105 pounds working pressure in 30 minutes and recovered 900 feet of oil.

• Middle Texas Coast

Second Pay Zones Given Tests In Bloomington Area Wildcat

Amerada tests second pay zone in Bloomington wildcat; discovery northeast of George West cleans for completion; wildcat in Mineral field area plugs back for Slick sand completion; drill-stem test run in wildcat northeast of Slick field.

Victoria County: Amerada Petroleum Corporation is testing the second pay level at Alexander Unit 1, wildcat discovery in Bloomington townsite a mile northwest of Heyser field. The first pay zone tested, at 4904-09 feet, flowed 97 barrels of 22.3-gravity oil with no water in 10 hours, flow being through ¼-, 3/16-, and ⅛-inch chokes. Second pay zone tested was at 4645-55 feet where a flow of 187 barrels of 22.7-gravity oil daily was gauged, flow being through 3/16-inch choke with 20 percent water cut. These perforations were squeezed and a new test was to be made of this level in an attempt to shut off the salt water flow. Total depth is 6921 feet with 5½-inch casing set to 4973 feet.

Live Oak County: Stanolind Oil & Gas Company's Pearl Harris 1, discovery 2½ miles north-northeast of George West, was cleaning for completion. While testing the well cleaned gas, condensate and wash water on 5/32-inch choke with tubing and casing pressures of 3200 pounds each. Total depth is 10,020 feet with 5-inch liner set to 9600 feet and perforated for completion at 8520-30 feet.

Bee County: Gasoline Production Company's Yoward 1, wildcat 1¼ miles west of Mineral field, has plugged back for completion in the Slick sand after drilling to 8500 feet with no shows below the Slick. With 7-inch casing set to 7818 feet, perforations have been made at 7483-93 feet for completion. A drill-stem test of the Slick at 7487 feet recovered a small amount of oil with 250 pounds working pressure.

Goliad County: Dan Auld et al's Kolodzey 1, wildcat 3 miles northeast of Slick field in Henry Pease Survey A-387, was coring below 7706 feet after making a drill-stem test. The test was made at 7622-38 feet and recovered 670 feet of salt water with a show of oil and developed 67 pounds working pressure in 20 minutes.

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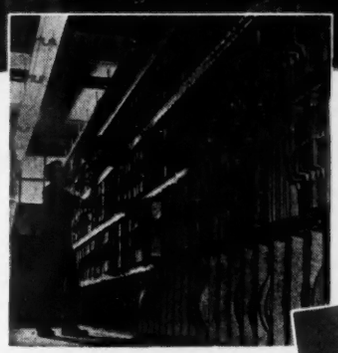

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• Upper Texas Coast

Manvel Field Southeast Flank Attempt Cleans Into Pits

Manvel southeast flank outpost cleans into pits; Evergreen wildcat perforates for new test; Willis area wildcat abandoned; Snowden's Rosenberg wildcat swabs for completion.

Brazoria County: Progress Petroleum Corporation's O. L. Rash et al 1, outpost on the southeast flank of Manvel field, was cleaning into pits for completion. Total depth is 5640 feet with 5½-inch casing perforated for completion at 5590-94 feet. A drill-stem test at this interval previously flowed oil. This test is in Thomas Spraggins Survey, Abstract 366.

San Jacinto County: Mac Drilling Company's Cynthia Payne 1, wildcat 4 miles south of Evergreen townsite in the Vital Flores Survey, was running new production test of perforations at 7686-98 feet. These perforations are at the same level as previous tests, former perforations having been squeezed in an attempt to shut off the salt water flow. A drill-stem test of this sand prior to setting casing made a good oil recovery.

Montgomery County: J. K. Kinsala & W. F. Newton's J. B. Spiller 1, wildcat in the Willis area, Wm. H. Hulon Survey, Abstract 262, has been abandoned as dry. Total depth is 4500 feet. The Cockfield was topped at 4019 feet and the Hockley at 3186 feet.

Fort Bend County: H. W. Snowden's Mary Hobbs 1, wildcat in the Rosenberg area 2 miles southwest of Cockburn's Rosenberg discovery, was swabbing in an attempt to get a flow from the 7900-foot sands. Total depth is 9018 feet with 7-inch casing set to 8438 feet and present tests being made from perforations at 7955-61 feet.

Eola Spacing Asked

Walker T. Pound, conservation officer of the Oklahoma Corporation Commission, has taken under advisement an application of Sohio Petroleum Company for 40-acre well-spacing in the new Eola area of Southern Garvin County. The field was opened by Sohio's Howard 1, completed for 2400 barrels of oil per day from the Bromide sand zone, from 10.046-234 feet. Pound took the application under advisement after there was no opposition at a hearing held before the commission. The British American Oil Producing Company joined Sohio in the application, while the Republic Natural Gas Company said it would not protest.

Firms May Merge

Reports are circulating that Pacific Western Corporation and Mission Corporation may merge. Pacific Western, a holding company, is closely connected with the Mission Corporation. Pacific Western owns 641,808 shares of Mission's stock.

Indian Lands Offered

The general superintendent of the Navajo Service, Window Rock, Ariz., announced that advertisements were issued to solicit bids for oil and gas mining leases on three separate tracts of Navajo tribal lands and two advertisements for allotted Indian lands.

• South Louisiana

Tigre Lagoon Test Has Gas, Condensate in Deep Sand

Tigre Lagoon wildcat tests gas and condensate; potential run on world's deepest producer; Stanolind to drill wildcat in Gulf of Mexico; ½ mile southwest extension at Reddel completed.

Iberia Parish: Union Oil Company of California's P. O. Landry 1, wildcat in 29-13s-5e, on the Tigre Lagoon prospect, tested gas and condensate from a deep sand to become a prospective field opener. Total depth is 11,843 feet with 7⅝-inch casing set on bottom. Casing was perforated at 11,480-500 feet where the well started flowing gas and condensate with 3600 pounds flowing pressure on tubing and had shutin pressure of 3900 pounds. Salt water cut of 20 percent accompanied the flow. These perforations have been squeezed for additional tests.

Shell Oil Company's new record-depth producer has been given potential. The Smith-State 3, Unit 1, Weeks Island field, flowed 502 barrels of 33-gravity oil daily through 10/64-inch choke with 2700 pounds flowing pressure on the tubing and gas-oil ratio of 1171/1. Casing was perforated at 13,878-88 feet for completion. Total depth is 14,397 feet.

Terrebonne Parish: Stanolind Oil & Gas Company has announced plans for a 13,000-foot wildcat in the Gulf of Mexico. The test will be State 1, Lease 757, Tract 752, and will be 7600 feet south from the northwest corner of the lease and tract, then 2100 feet east. Stanolind is the third company to announce intentions to drill in the open waters of the Gulf. Magnolia Petroleum Company has just completed a dry wildcat off the coast of Pointe au Fer field and is preparing to start another wildcat off the coast of St. Mary Parish. Humble Oil & Refining Company also will drill a wildcat off the coast of South Louisiana, but location has not been announced.

Evangeline Parish: Continental Oil Company et al's F. Cazan Fontenot 1, in 21-4s-1w on the southwest side of Reddel field and ½ mile from production, has been completed. On potential the well flowed 121 barrels of condensate and 1,437,400 cubic feet of gas daily through 11/64-inch choke. Total depth is 9943 feet with casing perforated at 9865-9906 feet for completion.

Officers for Mid-Continent Section of AIME Elected

Officers have been chosen by the Mid-Continent Section, AIME.

P. P. Manion, Jr., Stanolind Oil & Gas Company, Tulsa, was named chairman; John P. Hammond, Amerada Petroleum Corporation, Tulsa, first vice president; J. J. Arps, British American Oil Producing Company, Tulsa, second vice president; Russell H. Gwinner, Sunray Oil Corporation, Tulsa, secretary-treasurer.

Members of the executive committee for Tulsa are Ed Shakely, Shell Oil Company; J. N. McGirl, Tide Water Associated Oil Company; and J. Murray Walker, Lane-Wells Company, Tulsa.

C. Kenneth Eilerts, U. S. Bureau of Mines, and G. R. Elliott, Phillips Petroleum Company, Bartlesville, are members of the executive committee outside Tulsa.

It can happen in America

Too many people are not convinced that freedom and prosperity depend on private enterprise. Radicals, working alone, could never bring about state socialism in America. But they can do it with the aid of just such tolerance and apathy, plus the active support of misguided liberals prominent in public life. The system of free private enterprise has crumbled in country after country, followed by fear, confusion, privation and oppression. Our widespread government doles and controls, plus a spreading disregard for property rights, is more than a warning. It is Communism on our doorstep—a creeping paralysis of the principles of freedom and independence that have made us great among nations.

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• North Louisiana

Wildcat North of Delhi Field Tests Large Volume of Gas

Wildcat north of Delhi field tests large flow of gas; Shell core test in Union Parish rumored to have found saturated oil sand.

Richland Parish: C. H. Murphy, Jr., and Sun Oil Company's stratigraphic wildcat test 1¾ miles north of Delhi production, Federal Land Bank 1, SE NE 10-17n-9e, tested a large volume of dry gas from perforations at 3150-60 feet. Bottom-hole flowing pressure was 1700 pounds. Total depth is 3400 feet, with 5½-inch casing cemented at 3250 feet.

Union Parish: Very active leasing is being maintained in the area around Shell Oil Company's core test, Frost Lumber Company 2, C SW SE 14-22n-1w, 5 miles west of Conway. The well was plugged at 3250 feet without report of showings from Shell, but is said to have logged 12 feet of saturated sand in a comparatively shallow level, probably around 3100 feet, and about 20 feet of sand showing oil around 2500 feet. Shell is core drilling its acreage in the area and has already started rigging up at Frost Lumber Company 3, SW SE 31-23n-3e, 4 miles northeast of Marion. Next test will be the No. 4 well, SE NW 11-21n-2e. All tests are being carried to the Comanchean.

Winn Parish: Stanolind Oil & Gas Company's Tremont Lumber Company 1, C NW SW 20-12n-1w, wildcat 1 mile northeast of Joyce, is drilling below 10,358 feet. Operators are coring in attempt to ascertain whether the well has entered the Travis Peak horizon. The well drilled a break at 10,355 feet.

De Soto Parish: Skelly Oil Company's wildcat, Thelma Nash 1, SW NE 20-12n-16w, is drilling below 6810 feet toward the Travis Peak. The well apparently has found oil production on the north flank of the Logansport gas field in sands from 6106-16 feet.

Nueces Buys Properties

Nueces Oil Corporation, Dallas firm recently organized by Joe A. Humphrey and associates, purchased Sullivan and Garnett's holdings in the Agua Dulce field, Nueces County sector of South Texas, for consideration of $4,145,000, including a substantial sum payable from production. This deal involves four leases, aggregating 2385 acres with 20 oil wells that are producing 1500 barrels daily, and a gasser.

• Arkansas

Buckner Field Gets Second Travis Peak Sand Producer

Second Travis Peak sand producer completed in Buckner field; Spirit Lake outpost test reacidizing.

Columbia County: Grady H. Vaughn et al completed Johnson-Hampton A-1, C SE SW 8-16s-19w, as the second Travis Peak sand producer for the Buckner field. The well was pumping 192 barrels of oil daily from perforations at 4885-89 feet. Total depth is 4893 feet. It was reported that F. M. Hood's depleted Smackover well, L. B. Warren 1,

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C NW SE 9-16s-22w, in the Buckner pool, might be retested from the Travis Peak. Buckner field is on an east-west anticline with 2 local closures separated by a low saddle. Hood's abandoned well is on the north flank of the far east closure.

Forty-acre spacing was ordered for wells drilled and producing from the Travis Peak horizon in the Buckner field, and wells testing this horizon will be required to set a minimum of 825 feet of surface pipe. The temporary allowable of 100 barrels per day per well was made permanent.

Lafayette County: Magnolia Petroleum Company was reacidizing perforations opposite lime that showed oil from 2915-35 feet in Lester Brothers-1, C NW NE 22-16s-25w, southwest outpost to the Spirit Lake field. The well up to now has failed to get commercial production after perforating this interval and acidizing with 2000 gallons. Total depth is 5467 feet.

McAlester Fuel Company's wildcat C. Lee A-1, C NE SW 24-17s-24w, 7 miles south of Lewisville, is drilling below 4256 feet. No shows have been reported.

Recycling Plant Sold

Tom Graham, Corpus Christi producer, and associates have purchased Skinner and Eddy Corporation's recycling plant near Alice, Texas, for a reported consideration of $500,000. The plant is rated at 100 million cubic feet daily. The new owners have offered to make available a portion of the plant capacity to producers in the near by Seeligson field, which has an excess of gas production.

• Mississippi

Gulf's Amite County Wildcat Is Abandoned at 11,567 Feet

Deep wildcat in Amite County abandoned; Jones County prospect coring below 11,205 feet; deep wildcat in Marion County has water in Tuscaloosa; offset to Pine Ridge discovery is dry.

Amite County: Gulf Refining Company's J. A. Rowland A-1, SWc NW 39-4n-2e, wildcat which had been regarded as a probable commercial producer, has been abandoned at a total depth of 11,567 feet. Shows were encountered at various points in the Tuscaloosa zone topped at 10,584 feet but none responded to development. In final test casing was perforated at 10,590-96 feet but only water cushion and gas-cut mud were recovered.

Jones County: Gulf Refining Company's L. L. Majors 1, SEc NE 29-6n-11w, is continuing with core tests below 11,205 with no shows indicated below the 11,000-foot level. Latest cores reported at 11,195-205 feet recovered shaly sand and sandy shale.

Marion County: Humble Oil & Refining Company's C. Tullos 1, wildcat in SWc 12-1n-18w, has run into salt water in cores from the Lower Tuscaloosa at 9178-95 feet. Only shows encountered have been in the Upper Tuscaloosa where cores at 9044-56 feet recovered porous sand with fair stain and odor. In the Hub field Humble's E. O. Ball 2, SWc 17-2n-14e, was attempting to swab in production after reaching the field's producing zone in the Massive sand section. Cores from 9116-21 feet recovered a thin strata of gas sand, while cores from 9125-30 feet recovered 4 feet of oil sand. In the Baxterville field Gulf's George Westerfield 1, SEc SW 1-1n-17w, was continuing with production tests after the well started flowing 2 barrels of 12.6-gravity oil through open tubing from stringer sands of the Tuscaloosa zone.

Jefferson County: The Ohio Oil Company's Hard Times Plantation 1, NEc 35-8n-1w, wildcat is drilling below 8617 feet with no shows reported in lower horizons. Only shows indicated so far have been in the Wilcox zone where a slight odor and stain were recovered in cores at 3811-22 feet.

Jeff Davis County: In the Gwinville field 2 successful completions were recorded during the past week. Gulf's S. J. Cole 1, NWc NE NW 33-9n-19w, made a gasser with an initial flow at the rate of 6,110,000 cubic feet of gas and 50 barrels of gas-condensate per day. Sun Oil Company's R. E. Dale 1, SEc SW 13-9n-19w, had an open flow potential of 74 million cubic feet of gas per day.

Neshoba County: Slick Oil Co.-Plains Producing Co.'s J. D. Breazeale 1, NW SW SE 28-12n-10e, wildcat in the northern part of the state, is drilling below 5846 feet in lime. Cores from the Massive sand zone at 3911-26 feet recovered only salt water sand.

Adams County: Phillips Petroleum Company's Mrs. Vic Artman 2, 36-8n-2w, offset of the discovery and second test in the new Pine Ridge field, made a duster after bottoming at 10,276 feet. After missing productive sand the hole was whipstocked, but no shows were indicated at any point.

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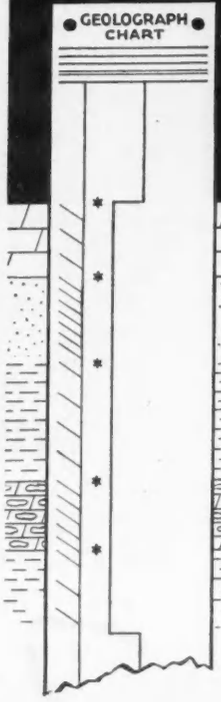

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indicated, despite 2 wildcat failures in a week. A wildcat permit was issued J. W. Murphy for Alex Park 1, SW SE 9-9n-23e, in Pike County, 4 miles northeast of Pronto; and another to The Carter Oil Company for Hubert Moseley 1, SW NW 3-10n-3w, in the East Gilbertown field of Choctaw County. A third permit was reinstated by Clint Steinberger for Swift-Hunter Lumber Company 1, C SE NE 18-8n-7e, Monroe County.

Georgia

The Georgia Oil and Gas Commission has issued a drilling permit to T. R. Davis for Bernie Brown 1, a wildcat 8 miles southeast of Vidalia, Toombs County, Gen. Militia District 1536.

Florida

Humble Oil & Refining Company's 3 Sunniland tests in Collier County were nearing the field's pay zone. Lee Cypress Company 3, SE SE 28-47s-29e, wildcat in the Sunniland area, was drilling at 11,642 feet in anhydrite. Gulf Coast Realties 9, C SE 24-48s-29e, in the field, was swabbing after setting tubing. Total depth is 11,679 feet. Gulf Coast Realties 5, C SW SW 20-48s-30e, second active field test, was drilling at 10,705 feet in dolomite.

Palm Beach County: Humble's Tuscon Corporation 1, wildcat in 35-43s-40e, 16 miles west of West Palm Beach, was drilling dolomite at 9316 feet.

• Michigan

Midland County Test Pumps Oil from Dundee After Acid

C. W. Collin and Jack Whitney's O'Dell 1, S½ SE NW 15n-1w, Midland County, 4 miles southwest of Edenville oil field, pumped 65 barrels net oil from Dundee lime pay at 3743-48 feet following a 250-gallon acid treatment. Before acid the well showed 150 feet of free oil in 5-inch casing. Operators were undecided whether to continue pump tests or deepen.

Newaygo County: A 40-quart nitro shot apparently damaged 5-inch casing on Sun Oil Company's Anderson 1, NE NW NW 14-12n-13w, southeast offset to the Kimball Lake pool discovery, to delay testing of a core pay in the Monroe at 2889-2903 feet. The well showed 57,000 cubic feet of gas before the shot.

• Illinois Basin

Effingham County, Illinois, Test Put on Pump After Acid

Spring rains, muddy roads, telephone strike slow work; test 1½ miles west of Clay City pool, Illinois, to be reacidized; Effingham County discovery swabs 50 barrels in 15 hours after acid.

Illinois

J. J. Lynn's Stanford 1, NW NW SW 36-7n-7e, Clay County, 1½ miles west of the Clay City pool, swabbed and flowed 4 barrels of oil an hour from McClosky lime at 3805-90 feet after 500 gallons of acid. Operator was preparing to reacidize.

Effingham County: Gulf Refining Company's Schultz 1 (formerly Schock's Schultz 1), SW SW NW 32-7n-7e, 5 miles north of the Bible Grove pool, swabbed 50 barrels of oil in 15 hours from Rosiclare at 2730-38 feet after 1000

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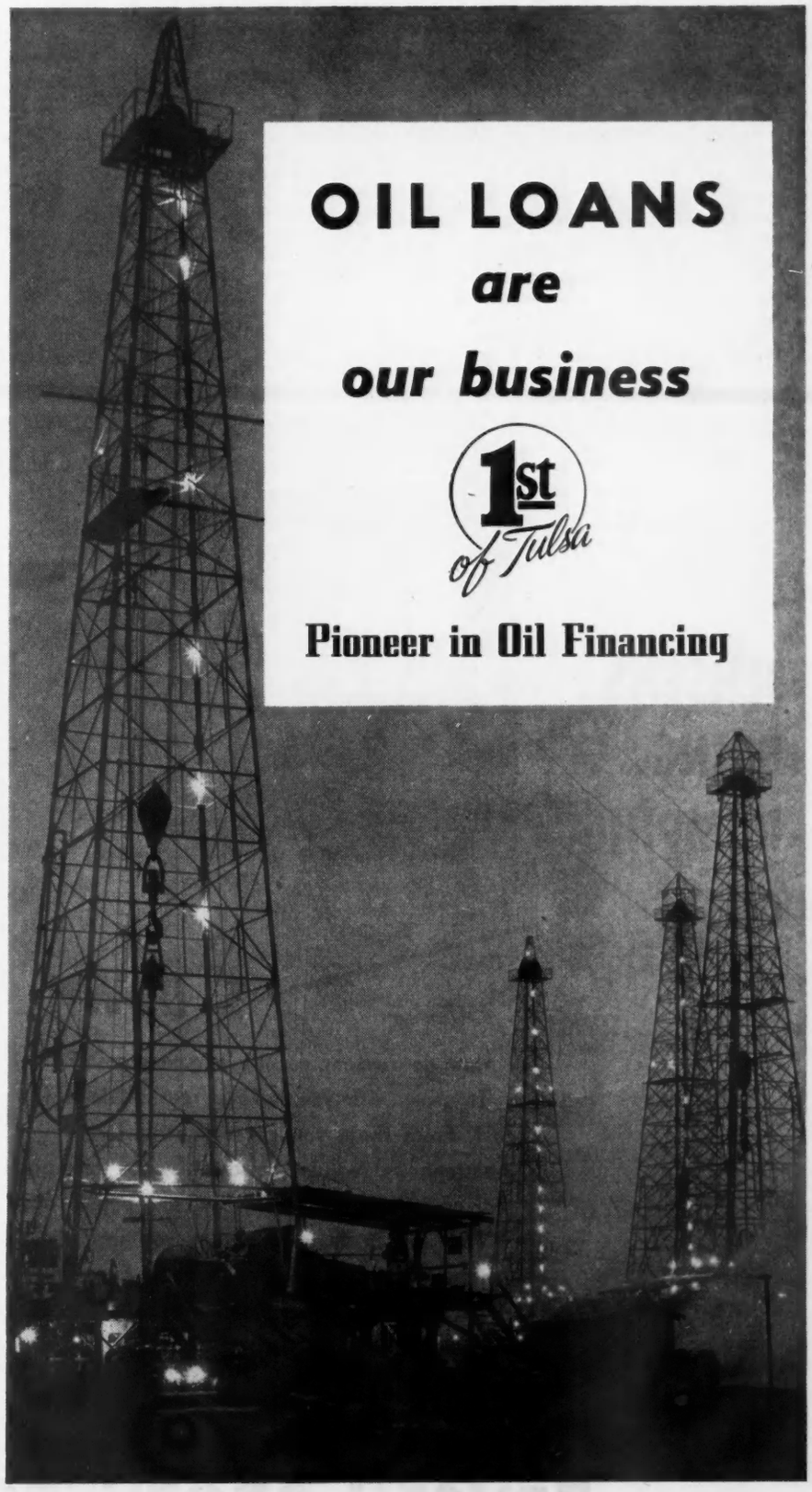

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gallons of acid. Operator was placing well on pump.

Edwards County: Ernest Eslick's Mavis 1, wildcat in NW NW NE 22-1n-10e, was abandoned at 3306 feet. The well encountered gas and oil-stained salt water during a 55-minute drill-stem test in McClosky lime at 3250-55 feet.

Indiana

B. M. Heath's Highman 1, SW SE SW 31-5s-13w, Posey County, a mile south of the Springfield pool, was running pipe to test Palestine sand at 1965-80 feet. During a drill-stem test the well flowed oil in 65 minutes.

Calvert and Willis' Hastings 1, SW SW NW 10-8s-14w, a mile north of the College pool, pumped 105 barrels of oil in 24 hours from McClosky lime at 2675-90 and 2710-90 feet. It is the discovery of North College pool.

• Ohio

Polk Pool, Ashland County, Given Northeast Extension

Polk pool gets northeast extension; lower sand gas discovery made at Gilmore; gas extension expands Hemlock Grove.

Ashland County: G. B. Harmon et al moved ¾ mile northeast of the discovery of the new Polk pool and struck a better well on O. S. Balliet 1, SW SW 17, Jackson township. The Clinton sand came in at 2894-907 feet and gauged 1,375,000 cubic feet of gas natural.

Tuscarawas County: A deeper pay in the old Gilmore gas field was discovered by H. D. Bowman when R. C. Denning 1, Lot 11, Washington township, was taken down to the second Berea sand. The upper Berea sand at 1208-45 feet had an estimated flow of 150,000 cubic feet and the lower Berea at 1249 feet gauged 1,300,000 at 1252 feet, where drilling was stopped and the well tubed. A considerable area around Gilmore will be redrilled as it is believed that the old wells did not penetrate the lower Berea sand.

Meigs County: The Hemlock Grove pool has a ½-mile east extension that is making gas in the top part of the sand. Walsmith and Risch's I. W. Taylor 1, SE SE 33, Orange Township, topped the Berea at 1740 feet and tubed at 1747 with a gauge of 540,000 cubic feet. In the south end of the pool in Bedford township, Nollem Oil Company's J. O. Smith 3, SE NW 1, made 30 barrels of oil with 200,000 cubic feet of gas and Preston Oil Company's H. R. Cook 6, NE SE 2, made 27 barrels.

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• California

Standard Reported to Have Strike in Ventura County

Oil discovery reported in Ventura County; remedial measures taken to eliminate water in new Bacon Hills discovery; test to be made of Cretaceous rocks in Fresno County; second well completed in new field southwest of Raisin City; Kettleman Hills Middle Dome discovery well to be redrilled past fish; second well completed in Alondra area of Los Angeles County; 30 wells may be drilled to Tar Zone in old town lot section of Huntington Beach field.

Ventura County: Standard Oil Company of California's McGrath 2 near Montalvo, 25-2n-23w, is unofficially reported to be an oil discovery. Standard's only comment is that "the well has been completed and shut in." An oil or gas well has been anticipated since a blowout 2 weeks ago. The crew was making a formation test with 400 feet of stub liner in the hole, including 60 feet of perforated. The well caught fire and burned for 2 days before being put out. A new rig was subsequently installed and pipe run, spliced on stub liner, and cemented. Plugged depth is 8660 feet. Location is about 1¼ miles from the seacoast with acreage in the area closely held. The Ventura Avenue field is about 5 miles north.

Kern County: Seaboard Oil Company's completion of Seaboard-Bandini 3-21 in the Bacon Hills area confirmed that a discovery had been made in the Oceanic sand. The well, in 21-28s-20e, was brought in flowing an estimated 500 barrels of 37.9-gravity clean oil through ¼-inch choke.

Twenty-four hours after completion, however, water broke in and the oil flow dropped to a trickle. Operator was confident that the source of the water is above the producing sand and he will gun-perforate and squeeze cement in accordance with this theory. Remedial measures will require a week to 10 days.

Fresno County: A test of the Cretaceous, deepest rocks productive in California, will be made by Seaboard about 30 miles north of Coalinga. Operator has staked Lillis-Welch 84-36 in 36-15s-12e. This is 7 miles south of Jergins Oil Company's Cheney Ranch 2 which found sub-commercial production in the Cretaceous about 8 years ago. Location is also about 1½ miles southeast of Western Gulf Oil Company's Lillis-Welch 1,

drilled 1600 feet into the Cretaceous and abandoned at 5600 feet in 1930. Only commercial production from the Cretaceous in California is in the Oil City area of the Coalinga field.

The Superior Oil Company has completed Keisson 35-22 in 32-15s-17e as the second producer in the new field discovered by this operator last month midway between the Raisin City and Helm fields. The well, which is about ¼ mile west of the discovery, was brought in flowing 202 barrels of 32-gravity clean oil through 11/64-inch choke. Hakala 75 will be drilled on a stepout location about the same distance east of the discovery. Union Oil Company will drill Waechter 44-32, offsetting the discovery well on the northwest.

Kings County: Standard will redrill 73-30V, its Kettleman Hills Middle Dome Eocene discovery well, from 10,971 feet where whipstock has been set just above the fish. Water problem arising after the original completion could not be overcome because of drill pipe in the hole from 11,060 feet to bottom at 12,389 feet.

Los Angeles County: The British American Oil Producing Company has completed Bodger 3 in 22-3s-14w, second producer in the Alondra field, flowing a reported 1000 barrels. Operator was withholding information until certain that a sustained producer has been obtained. Total depth is 9145 with top of the oil sand at 9100 feet. H. C. Christie was grading location for Johnson 1 near the intersection of Compton and Cerise Streets in 22-3s-14w.

Richfield Oil Corporation has made a dual completion of Union Pacific Unit 4 in the East Los Angeles field. From the two producing intervals at 8255-385 and 8570-90 feet, the well is flowing 675 barrels of 34.8-gravity oil, 14 percent cut, choke varying from 22/64- to 40/64-inch.

Orange County: Calumet Gold Mines Company is prepared to drill a maximum of 30 wells to the tar zone in the old section of the Huntington Beach field. Extent of the program will depend on the outcome of 3 test wells presently scheduled.

Santa Barbara County: Trans-Oceanic Oil Company's plan to drill a deep test in the Mesa field within the Santa Barbara city limits struck a snag when the city council revoked a drilling permit obtained by the company in 1941, or prior to the enactment of a city ordinance forbidding oil drilling within the city. The company has taken the matter to court.

• Rocky Mountain Area

Wildcat on Centennial Fault Block, Wyoming, Is Failure

Centennial fault block, Albany County, Wyoming, has another failure; Hudson field Madison project may be plugged back and completed in the Tensleep; Antelope area wildcat may be plugged back to test Lakota; North Cut Bank area, Montana, likely to get Madison extension; Powder Wash, Colorado, extension seen.

Wyoming

Another wildcat has failed on the Centennial fault block in southern Laramie Basin at Dyer & Rice et al's May 3, SE NE NW 5-15n-77w, Albany County. Two previous wells drilled on the structure were abandoned at shallow depths without testing possible oil-producing horizons. The present well was abandoned at 3099 feet after finding water in Sundance at 3080 feet. The southern Laramie Basin has been very active for leasing and wildcatting since discovery of oil in the Casper (Tensleep) formation at Quealy Dome, 12 miles north of Centennial, and at Herrick Dome, 15 miles northeast of Centennial. The Superior Oil Company is now completing its second test at Herrick, and apparently this field will have a very small producing area. The new well is ¼ mile southwest of the discovery and found the Casper approximately 120 feet lower. Water was logged at a high level and it is expected that the well will be only a small producer.

Fremont County: Stanolind Oil & Gas Company's projected Madison test at Hudson field in Terry 3-M, NW SW SW 19-2s-2e, probably will be plugged back and completed in the Tensleep. The well encountered a strong water flow in the base of the Tensleep sand and blew out more than a week ago making an estimated 80,000 barrels of water daily. Casing was run to total depth at 1866 feet after the well was killed, and plug run to bottom. When this plug was drilled the well again started flowing water and it is doubtful that the operator will attempt to drill through the fractured zone for the Madison test. This field produces from the Embar and Tensleep horizons, and is one of the oldest fields in the Rocky Mountains. More than 2½ million barrels of crude have

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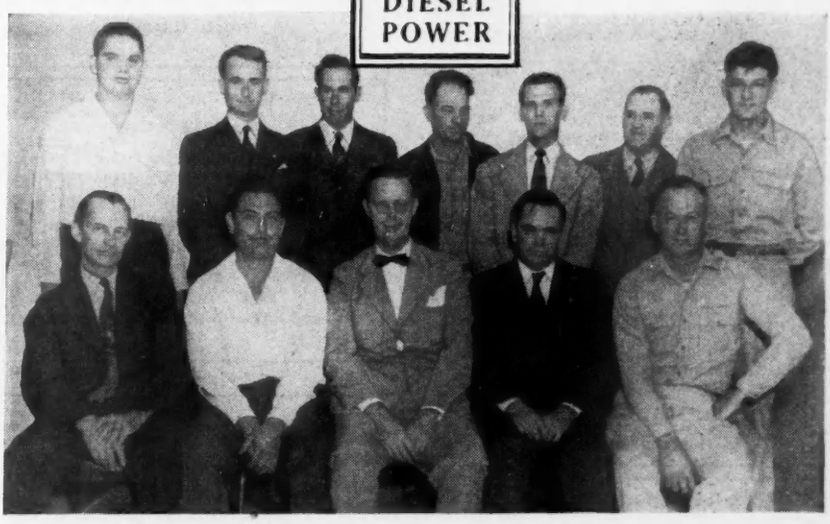

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been produced from the field since its discovery in 1909.

The General Petroleum Corporation wildcat in the Antelope area, southwest of Crooks Gap field, is drilling below 10,750 feet in the Nugget sand of the Sundance. The well is No. 45-25-G, NE NE SW 25-27n-94w, and Nugget has been extremely hard and tight, with no shows of oil or gas reported. The well probably will be plugged back for a test of the Lakota section, topped at 10,099 feet. There were small shows of oil and gas reported in this formation, but the section was too hard and tight for possible production, according to reports.

Fifteen miles northeast, at Crooks Gap field, Sinclair Oil Company's Unit 7, SW SW NE 13-28n-93w, is a mile north extension. The well topped the Lakota at 5115 feet and on drill-stem test in the top of the sand recovered 2880 feet of oil in 30 mintes. The lower section of the sand between 5210-78 feet made 1770 feet of oil in 30 minutes, and casing was being run for production tests. The well tested 500 feet of 36-gravity oil in the Muddy sand a week ago, and the operator may plug back and produce this zone. Muddy is not produced in the field, although Unit 6, a mile south, also had good shows in that formation. The field produces 2000 barrels daily from 6 Lakota sand wells and the oil is transported via Sinclair pipe line to its refinery near Rawlins.

Montana

Union Oil Company of California's Teterud 2, C SE NE 34-36n-5w, North Cut Bank area, Glacier County, may extend the Madison oil producing area southeast. The well is on the north end of the Cut Bank sand gas area, and was drilled to 2884 feet, total depth, 37 feet in the Madison lime. It made an estimated 10 million cubic feet of gas and then started spraying oil from the top of the Madison. Casing is now being run and additional tests will give further information as to production. An oil extension at this location will lead to considerable drilling development between the well and the North Cut Bank oil producing area.

Colorado

Sprecher Drilling Company's Government 1, SW SW NW 34-12n-97w, Powder Wash, Moffat County, apparently will extend the field more than a mile east. On drill-stem test between 4586-98 feet the well made more than 500 feet of oil with considerable gas in ½ hour. After the tester was closed and packer removed the well flowed for a short time from this zone. Production is from lenticular Wasatch (Tertiary) sands, and initials in other wells in the field have been more than 1000 barrels of light oil daily. On another test between 4598-608 feet the well made 130 feet of oil and oil- and gas-cut mud, no water.

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■ Wanted to Purchase: A used Schmidt type vertical intensity field magnetometer in good condition. Address Box 20 c/o The Oil Weekly, Houston, Texas.

ATTENTION PRODUCERS AND BROKERS: I am interested in buying production for my own account. Must be good stuff and must pass the scrutiny of recognized petroleum engineers.

J. L. STONE,
Box 548, Phone No. 6 San Juan, Texas.

LEASES, DRILLING, ACREAGE, ETC.

■ JOHN O. BANKS pays top prices for producing royalties, 302 Gilbert Bldg., Beaumont, Texas.

EXPLORATORY FAILURES

ALABAMA WILDCAT

Conecuh County: Hunt's T. R. Miller Mill Co. 5, nw ne 1-4n-11e, abnd 4-7-47 at 8324.

ARKANSAS WILDCATS

Hempstead County: B. F. Phillips-E. H. Lange's J. M. Walker 1, c w½ nw se 17-10s-24w, base Annona 215, L. Cretaceous 677, James 996, Travis Peak 1120, Eagle Mills 1501, abnd 4-6-47 at 1865.

W. R. Wright et al's J. F. Shearer 1, c e½ se nw 13-12s-26w, base Annona 650, L. Cretaceous 1212, Massive Anhydrite 1682-1776, James 2084, Travis Peak 2259, Eagle Mills 2855, abnd 4-4-47 at 3216.

Union County: McAlester Fuel Co.'s J. H. Patterson A-1, c se sw 19-18s-14w, Nacatoch 2058, Saratoga 2273, Annona 2273-2488, Tokio 2832, base Massive Anhydrite 2988, James 3030-93, Travis Peak 3445, abnd 4-5-47 at 7302.

CALIFORNIA WILDCATS

Kern County: Independent Exploration Co.-Oceanic Oil Co.'s Roco 4, 18-29s-21e, Cymric area, 1st Carneros 2095, Carneros 2180, abnd 4-6-47 at 2319.

Union Oil Co.'s Olcese 16A-22, 22-28s-29e, Round Mt. area, Basal Jewett 1456, gray Vedder 1835, abnd 4-6-47 at 1865.

Solano County: Amerada's Wineman Community 1, 22-6n-2e, Dixon area, Wineman Sand 4798, abnd 4-10-47 at 4815.

FLORIDA WILDCAT

Alachua County: Tide Water's J. A. Phifer Estate 1, sw ne 24-9s-21e, abnd 4-2-47 at 3228.

KANSAS WILDCATS

Cowley County: Frank McMillim's Childers 1, se sw ne 36-34s-4e, abnd 3316.

Ellis County: Darby & Bothwell's Truan 1, nw nw nw 27-12s-18w, abnd 3785.

Marion County: Eldorado Ref. Co.'s Stauffer 1, nw nw se 5-19s-1e, abnd 3558.

Darrah & Aurell et al's Olsen 1, ne ne nw 8-20s-3e, abnd 2950.

Rooks County: Phil-Han Oil Co. et al's Veverka 1, se se se 7-8s-18w, abnd 3413.

Royer & Farris' Lowry 1, se sw ne 17-8s-19w, abnd 3505.

Cities Service's Wise 1, se se se 19-10s-18w, abnd 3746.

Saline County: Lowell Drlg. Co.'s Miller 1, se se nw 26-15s-3w, abnd 3515.

ILLINOIS WILDCATS

Fayette County: John C. Powell's Murray 1, se sw ne 32-4n-1w, abnd 1416.

Lawrence County: Sam Malis' Lsist 1, ne ne nw 24-2n-14w, abnd 3025.

Madison County: Hageman Properties' Laakman 1, ne se 18-3n-10w, abnd 1933.

Wabash County: O. D. Sharp's Ankenbrandt 1, nw nw se 5-1s-13w, abnd 2803.

NORTH LOUISIANA WILDCATS

Franklin Parish: Gulf's Geo. Washington 2-A 100 fr sl 200 fr wl 11-15n-8e, Wilcox 1236, Midway 1815, abnd 4-9-47 at 3129.

Sabine Parish: Richard W. Norton, Jr. et al's D. C. Etheridge 1, 1971.3 fr el 1980 fr sl 12-9n-12w, base Austin 2150, Paluxy 3426, abnd 3-29-47 at 6009.

Winn Parish: Naylor Drlg. Co.'s B. B. Terrell 1, c se se nw 2-13n-3w, abnd 4-4-47 at 6010.

SOUTH LOUISIANA WILDCAT

Terrebonne Parish: Magnolia's State-Mineral Lse. 673-1, Gulf of Mexico, 7260 fr nl 660 fr wl lse, Tr 474, blk 58, 6 mi fr Point Au Fer fld, abnd 4-4-47 at 12,874.

MISSISSIPPI WILDCAT

Amite County: Gulf's J. A. Rowland, Trustee A-1, swc nw 39-4n-2e, Wilcox 4893, Tuscaloosa 10,584, Mar. Tuscaloosa 10,928, Massive sd 11,468, Comanchean 11,513, abnd 4-5-47 at 11,567.

NEW MEXICO

Socorro County: Miller & Miller's Mitchell 1, c nw ne 33-4n-8e, abnd 4-2-47 at 3593.

OHIO WILDCAT

Muskingum County: Moran Bros.' Hamline Largent 1, nw se 19 Jackson, Clinton 3075, abnd 4-2-47 at 3170.

OKLAHOMA WILDCATS

Carter County: Dale Sneed et al's Fish 1, 10-1s-2w, abnd 1158.

Coal County: Stanolind's Aetna Life 1, c sw ne 29-3n-10e, abnd 6690.

Cotton County: J. Ben Russell's Parrua 1, ne ne ne 24-3s-11w, abnd 2021.

Murphy Oil Co. et al's Hilbert 1, sw ne nw 10-1s-10w, abnd 2504.

Neeld Hood Drlg. Co.'s Gregson 1, nw sw se 9-3s-13w, abnd 1738.

Garvin County: McElreath & Suggett's Kennedy 1, se sw nw 14-3n-1w, abnd 4355.

Hughes County: Quinn-Phillips et al's Warren 1, c s½ nw se 35-6n-8e, abnd 1250.

Jefferson County: R. B. Dilliard's Cotner 1, sw sw nw 4-6s-8w, abnd 2001.

Cities Service's Linton 1, sw sw sw 7-7s-6w, abnd 6384.

Tom Hunter's Pfile 1, nw nw nw 14-7s-6w, abnd 2268.

Kiowa County: Amerada's Boake 1, sw sw sw 29-7n-16w, abnd 2481.

H. J. Hartwell's Hauser 1, nw ne sw 23-7n-18w, abnd 1254.

Logan County: Stanolind et al's LeGrande 1, ne ne nw 27-15n-1w, abnd 6042.

Noble County: Gulf et al's Hon 1, ne ne sw 34-24n-1e, abnd 4840.

Okfuskee County: E. K. Perry et al's Merrell 1, nw nw se 29-11n-9e, abnd 3518.

Pontotoc County: Tuesday Oil Co.'s Pratt 1, nw nw ne 6-4n-4e, abnd 2176.

Seminole County: Amos & Workman's Spears 1, se se nw 19-6n-8e, abnd 1420.

Stephens County: T. H. McCasland's Ecovich 1, ne se sw 15-1s-9w, abnd 3470.

WEST TEXAS WILDCAT

Cochran County: Superior's Cameron 1, 200 nsl 660 wel labor 9, or 6600 nsl 1320 wel lge 86, Greer CSL, elev 3722, San Andres 3760, abnd 4-7-47 at 7035.

NORTH CENTRAL TEXAS WILDCATS

Coleman County: Neely & Neely's McCullough 1, 1380 snl 1500 wel M. Lappe sur 744, abnd 4-1-47 at 2078.

West Central Drlg. Co. et al's McCord 1, 1193 ewl 3750 snl sect 16, J. H. Gibson sur, abnd 3-27-47 at 3453.

Jones County: R. H. Roark et al's King 1, 1320 ewl 750 nsl N. Scott sur 16, abnd 4-4-47 at 1690.

Shackelford County: Humble's Green 1, 467 nsl 1787 ewl sect 1548, TE&L Co. sur, elev 1207, Bend 3563-3943, Mississippi 4322, abnd 4-4-47 at 4555.

NORTH TEXAS WILDCATS

Clay County: J. G. Fowler et al's Taylor 1, 7450 nsl 1700 wel E. T. Mitchell sur, Canyon 2378, abnd 4-3-47 at 2524.

Cooke County: Redman Bros. et al's Conyers 2, 660 nsl 150 ewl of n½ H. Ledbetter sur, elev 855, jkd and abnd 4-8-47 at 2443.

Wilbarger County: Green & Gray Construction Co.'s Watts 1, 4100 nsl 4787 ewl J. Hensley sur, elev 1229, abnd 4-8-47 at 2000.

NORTHEAST TEXAS WILDCATS

Bowie County: Tide Water-Seaboard's Dalby & Joiner 1, 467 out nec of 80-ac tr, D. Puckett sur, elev 288, Pecan 1655-2400, Blossom 2580, Sub-Clarksville 3280, Eagleford 3220, Woodbine 3610, Comanche 3920, Goodland 4485, Paluxy 4521, abnd 4-7-47 at 4825.

Cherokee County: Delta Drlg. Co.-Al Brown's Lester 1, 540 ewl 4700 snl John H. Russell sur, elev 320, Austin chalk 4175-4340, Woodbine 4340, Georgetown 4880, Paluxy 5910, Glen Rose 6150, Massive Anhydrite 7700-7950, James 8440, Pettit 8710, Travis Peak 9030, abnd 4-14-47 at 9240.

Houston County: Continental's Texas Long Leaf Lumber Co. 1, 1675 fr nwl 800 fr swl Nicholas Lynch sur, elev 268, Midway 4958, Navarro 6290, Pecan chalk 6800, Gober 7197, Austin 7358, Sub-Clarksville 7837, Woodbine 7925, abnd 4-5-47 at 8530.

SOUTH CENTRAL TEXAS WILDCATS

Atascosa County: Frank Frohnhoeffer's W. I. Price 1, 405 fr wl 1263 fr nl 90-ac lse, 5 mi n nw Poteet, R. Herrera sur, 44, Wilcox 1390, abnd 4-1-47 at 3856.

McMullen County: Humphries & Hotchkin's C. C. Wentz 1, 330 fr s&wl ne¼ sect 58, sbdn Two Rivers Rch, J. M. Campbell sur, 400-ac lse, abnd 4-1-47 at 1466.

SOUTHWEST TEXAS-LOWER COAST WILDCATS

Hidalgo County: Sun's Tom Vessels 1, 467 fr nly/sl 4000 fr wl sh 15, Porc 73, 74 & 75, being in Porc 74, 1649.49-ac lse, abnd 4-1-47 at 7003.

Jim Hogg County: Cecil Hagen-Mills Bennett's M. Garza Est. 1, 2350 fr sel 2350 fr nel sect 39, blk 11, Rafael de la Pena Gr, 1250-ac lse, abnd 4-5-47 at 2547.

Nueces County: Southern Minerals Corp.'s H. Groeneveld 1, 1400 fr nl 1400 fr wl sect 45, Richard King Farm lots, R. L. de Jean Gr, 2 mi nw Agua Dulce fld, 1¾ mi e of Richard King fld, 439-ac lse, abnd 4-4-47 at 6524.

MIDDLE TEXAS COAST WILDCAT

Calhoun County: Cecil H. McSpadden's H. A. Monson et al 1, 467 fr sel 1460 fr swl Gulf Coast Fruit Land Co. sbdn and 103.2-ac lse, Benito Morales sur, abnd 4-4-47 at 6019.

UPPER TEXAS COAST WILDCATS

Fayette County: Curtis Singleton Drlg. Co.'s John Krause 1, 330 fr swl 116-ac lse, 660 nw at ra fr nwl Gulf Braun 100-ac lse, Green DeWitt Lge, abnd 3-11-47 at 7378.

Ft. Bend County: Texas Co.'s A. P. George 1, start at n cor 286.5-ac lse, and blk 30 at Big Creek, go 700 sw alg nwl same th 200 se at ra to lcn, Barnabus Wickson sur, abnd 4-3-47 at 3960.

Harris County: McDannald Oil Co.'s Fee 1, 467 fr s&wly/wl 316-ac lse, 2600 fr nl 467 fr el Ferdinand Bell sur, n of Dyersdale fld, abnd 4-5-47 at 4515.

WYOMING WILDCAT

Albany County: Dyer & Rice et al's May 3, se ne nw 5-15n-77w, Centennial area, Frontier 130, Lakota 2330, Sundance 3080, abnd 4-6-47 at 3099.

DAN L. CLARK W. M. AVERILL RUPERT COX

DAN L. CLARK DRILLING CO.

Drillers of

OIL AND GAS WELLS

•

POWER AND STEAM RIGS

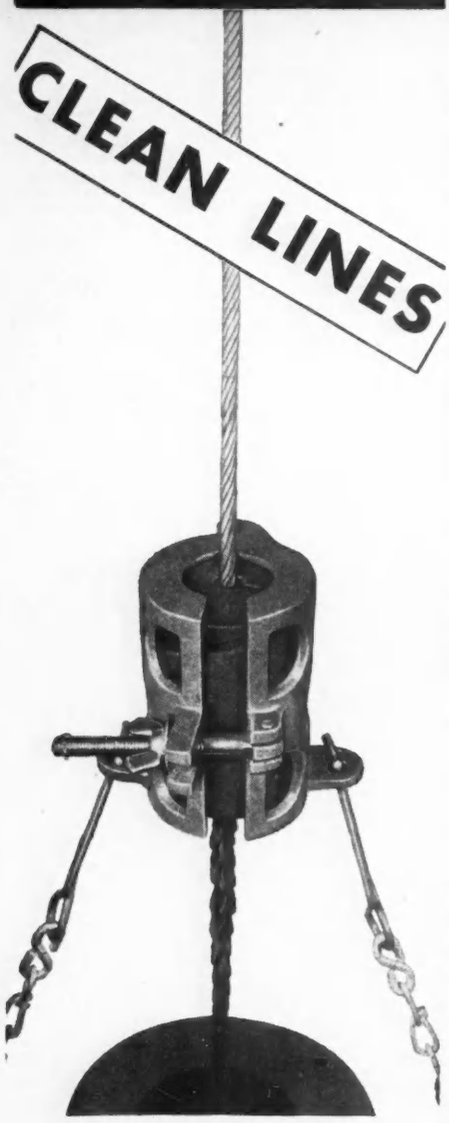
NIXON BUILDING

CORPUS CHRISTI, TEXAS

Local 7746-7747 Long Distance 95

"Best Bet Yet"

CLEAN LINES



A clean wire line helps your crew. They can work safer and better on a clean floor, free from drippings. With a Patterson-Ballagh Wire Line Wiper the line is stripped completely of mud and oil. A compact steel housing contains a spiral rubber which is inexpensive and easily replaced. The rubber wipes the line as it comes out of the hole. Sparkproof. Use one on every well.

Refills made of PBX Special Rubber—Oil and weather resistant.

See Composite Catalog

Specify PATTERSON-BALLAGH

A DIVISION OF BYRON JACKSON CO

"Best Bet Yet"

WIRE LINE WIPERS

1900 E. 65th Street, Los Angeles 1
6247 Navigation Boulevard, Houston 11
808 Graybar Building, New York 17
931 Russ Bldg., San Francisco 4

SQUEAKS from the BULL WHEEL

Nose for News

Lecturer: "I speak the language of wild animals."

Usual-voice-from-the-rear: "Next time you see a skunk ask him what's the big idea."

Cautious Cuddler

"Come in a little while, George."

"Nope. Better not, honey."

"Wish you would. It's awfully lonesome. Mother has gone out and father's upstairs with rheumatism in the legs."

"Both legs?"

"Yes."

"Then I'll come in a minute."

Pardon It, Please

Two little ants were running along a cracker box when one of them said: "Why the heck are we running so fast?"

"We have to—it says right here, 'Tear along the dotted line!' "

Lid's Off the Bankroll

A Scot who had worn the same hat for 25 years finally decided to buy a new one. Entering the neighborhood hat shop he said, "Well, here I am again."

Later, Both

"Your baby is a determined little rascal."

"Yes, he'll have his bottle or bust."

Prime Insult

"George!" screamed his wife. "There's lipstick on your collar! Whose is it? "Natalie's?"

"Nope."

"Virginia's?"

"Nope."

"Mabel's?"

"Nope. Say, you're naming everybody in your bridge club. Don't you think I have friends of my own?"

Hints for Householders

"Be careful of a live wire when you're in the bath tub."

"Oh, I am. I always lock the door."

This Curious World

Then there was the bride who ran away while she was making a cake because the directions said, "Put one egg in, then beat it."

The average man is neither as grand as his wife thought he was when they were engaged nor as much of a dud as she thinks he is now that they are married.

There's nothing like a divorce to make a woman feel like a new man.

"Pardon me, Mrs. Aster, but that never would have happened if you hadn't stepped between me and that spittoon."

Want ad: Girl needs job. Willing to struggle if given opportunity.

Good Substitute

A fellow seven feet tall applied for the job of lifeguard.

"Can you swim?"

"Nope, but I can sure wade like hell."

Illegal Sweets

"My wife has no sugar at all in our house," he was telling the rationing board. "Not one single grain.'

"Remember, now, you're swearing to this. You've got to tell the truth."

"Gotta tell the truth, eh?"

"Absolutely. Or you'll go to jail."

"In that case, I'll tell the truth. We ain't married."

The Woman's Way

"What a stunning hat! How much did it cost you?"

"Two hundred dollars. Seventy-five cents for the hat and $125 for the suit to match."

Recount in Order

A drunk lurched into the city hall and dropped anchor before the window of the Registrar of Births and Deaths.

"Mornin', gentlemen. I wanna register the birth of twins."

"Why do you say 'gentlemen'? Can't you see I'm alone here?"

"Alone? Only one of you? Say, I better go home and take another look. Maybe it isn't twins after all."

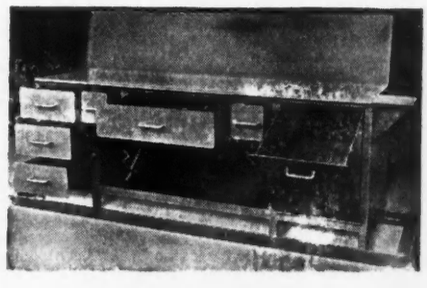
The Simple Life

"My grandfather lived to be over 90 and never used glasses."

"Well, lots of other people prefer it out of the bottle, too."

OWEN

TYPE "A" WORK BENCH



PLENTY OF STORAGE ROOM

There's space in this all-steel, all welded bench for all the hand tools on any drilling rig. Six big drawers and a rag bin, with a total of over 14 cubic feet of storage space, plus the tool pegs on the back apron, provide room for protecting all tools against loss or damage.

Buy one for each rig you own . . . and they'll pay for their cost in the savings they effect.

SOLD THROUGH ALL SUPPLY STORES
Distributed in California by Howard Supply Co., Los Angeles, California.

OWEN TOOL COMPANY
ROUTE 9 BOX 800-B Y-2-4341
HOUSTON TEXAS

Lester M. Goldsmith, chief engineer of The Atlantic Refining Company of Philadelphia, has received the decoration for exceptional civilian service for his contributions to the installation of an oil pipe line under the English Channel preceding the invasion of Normandy — the famed "Operation Pluto."

L. M. Goldsmith

The presentation was made in Washington by **Lieut. Gen. R. A. Wheeler,** chief of engineers of the U. S. Army. The award is the highest honor the War Department can confer upon a civilian.

»

James A. Wilson has been named manager of the Houston division of United Gas Corporation, succeeding W. B. Head, Jr., who resigned to enter private business. Wilson has been in the gas utility field since 1930 and has been assistant division manager at Houston since January, 1946.

»

Harold M. McClure, independent oil producer and past president of the National Stripper Well Association, was elected mayor of Alma, Mich., April 7.

»

J. G. Coultrup of Houston, former process engineer for Creole Petroleum Corporation in Venezuela, has joined Telepsen Construction Company as head of the new petroleum process engineering department. With Creole, Coultrup was process engineer on the construction of crude stabilization units in the Jusepin and Mulata fields.

»

C. G. Kirkbride, former professor of chemical engineering at Texas A. & M. College, has joined Houdry Process Corporation as director of Houdry Laboratories. Kirkbride taught chemical engineering at Texas A. & M. for two years after serving as chief of chemical engineering development for Magnolia Petroleum Company at its Dallas laboratories. Previously he was assistant director of research for Pan American Refining Company and research engineer with Standard Oil Company of Indiana.

»

Stuart E. Buckley head of production research for Humble Oil & Refining Company, Houston, spoke on "Well Spacing" before the Mid-Continent Section, AIME, in Tulsa.

»

C. D. Stephenson, geologist in the Jackson, Miss., offices of Southern Natural Gas Company, has been promoted to chief geologist of Southern Production Company with principal offices in Shreveport. Stephenson went to Jackson six years ago from Argentina, where he was associated with the government in oil explorational activities. He has been with Southern Natural Gas for four years.

Milton G. Kerr, comptroller of Union Oil Company since 1939 and an employe for 37 years, has retired. **Irving J. Hancock,** assistant comptroller since 1939, succeeds him. **Harold W. Sanders,** secretary and treasurer, becomes a vice president and treasurer. Sanders, who has been with the company since 1926, is also a director and a member of the executive committee.

Milton G. Kerr

R. F. Niven, assistant secretary and assistant treasurer, is the new secretary. All other officers of the company were reelected.

»

Howard N. Simms, metallurgical engineer for Black, Sivalls & Bryson, Inc., Oklahoma City, spoke on "Welding Control for Manual and Automatic Processes" before the Tulsa Engineers club.

»

G. E. Gibson, district landman at Casper, Wyo., for Phillips Petroleum Company, has been transferred to Phillips' Houston division, and is replaced at Casper by **Lloyd Tucker** of Phillips' Bartlesville, Okla., office.

»

W. E. Wood, retired Okmulgee, Okla., oil man, will take office as Okmulgee mayor April 21.

»

Everett M. Barber, supervisor of the engineering research department of The Texas Company Research Laboratory; **Jay B. Malin,** mechanical engineer of the same company; and **Joseph J. Mikita,** director of the engineering laboratory, petroleum chemicals division, E. I. du Pont de Nemours Company, have been awarded Levy Medals "in recognition of their paper, 'The Elimination of Combustion Knock'."

»

Burton C. Dunn and **M. J. Boreing** of Wichita, Kansas, are opening consulting geological offices in Durango, Colo. Dunn has been district geologist for The Ohio Oil Company in Kansas, and Boreing has been a member of the firm of Bird & Boreing, consulting geologists in Wichita.

»

Miles Carmichael and **Ted Riseling** have formed two companies, Cathodic Protection Company and Corrosion Engineering Service, with offices in the Petroleum Building, Oklahoma City. They will act as state agents for Good-All Electric Company's rectifiers and other lines of protective devices and will offer consulting service on corrosion problems.

»

Donald E. Holbrook of Clare, Mich., member of Freeman Oil Company, independent producing company, was elected circuit judge for the three Michigan counties of Clare, Isabella and Midland. Holbrook, who will observe his 38th birthday in August, will be the youngest circuit judge in the state.

"Red Wheel"
VALVES, HYDRANTS
And Pipe Line Accessories

Write for Catalog No. 34

CHECK VALVE

GATE VALVE

M & H valves are used in the oil industry for water, gas, steam, oil, chemicals and are furnished in all commercial sizes from 2" to 30", inclusive. They are cast iron body, bronze mounted, furnished double disc parallel seat or solid wedge. They are heavily proportioned and have a high factor of safety.

A. W. W. A. HYDRANTS
Underwriters Approved

Conform to American Water Works Association Specifications. Approved and listed by Underwriters' Laboratories and Associated Factory Mutuals. Well known and widely used for many years.

SPECIAL TRAFFIC MODEL is designed to yield at ground line under impact, repair being simply renewal of breakable bolts and breakable coupling on stem. High efficiency because barrel diameter not reduced and there are no working parts or obstructions in waterway.

OTHER M & H PRODUCTS

Fire Hydrants
Gate Valves
Tapping Valves
Special Castings
Tapping Sleeves
Check Valves
Floor Stands
Extension Stems
Mud Valves
Flap Valves
Sludge Shoes

M&H VALVE
AND FITTINGS COMPANY
ANNISTON, ALABAMA

Rodolfo M. Fernandez, official representative of Petroleos Mexicanos in Washington, D. C., as well as petroleum attache at the Mexican Embassy in the U. S., has resigned to enter into private business in Mexico City. Fernandez is well known in American oil circles and has been in the oil business since 1922, when he was assistant superintendent of refinery construction, pipe line installations and drilling for Huateca Petroleum Company in Mexico. He became special assistant to Vicente Cortez Herrera, first general manager for Petroleos Mexicanos, in 1938 following expropriation and served in that capacity until 1941, when he was transferred to Washington.

Rodolfo Fernandez

»

A. S. (Joe) Telfer has been named representative for Nordberg Manufacturing Company of Milwaukee in the Texas and Mid-Continent fields, with headquarters at Houston. For the past 22 years he has been associated with Busch-Sulzer-Bros.-Diesel Engine Company, recently acquired by Nordberg.

A. R. Robinson has been named manager of the Seattle branch of John A. Roebling's Sons Company. Robinson Joined Roebling in 1936 as a salesman in the Portland branch. A graduate of Oregon State College in 1924, Robinson began his career in engineering.

»

G. W. Christopher has been made manager of standard pipe sales and **J. W. Owings,** manager of oil country tubular sales, for the Youngstown Sheet and Tube Company.

»

Daniel J. Martin of Houston, Hughes Tool Company metallurgist, told members of the National Editorial Association that independent oil companies during 1946 drilled 23,000 of the 30,000 wells drilled in this country. Martin was speaker at a dinner which climaxed a tour of the Houston industrial area by the visiting newsmen.

»

Robert D. Juve has been named synthetic rubber coordinator for the Goodyear Tire & Rubber Company.

»

Ed Robertson has been named sales manager for Iverson Tool Company, Tulsa. He formerly was employed for 23 years by Atlas Supply Company and was manager of branch stores at the time of their sale to Jones & Laughlin Supply Company. For the past three years he has been a district sales manager for Jones & Laughlin.

C. R. (Red) O'Dell has been named manager of Tuboscope Company's West Texas Division with headquarters at Odessa, replacing **C. E. Luna** who is on leave of absence. O'Dell has been with Tuboscope for several years in Oklahoma and Kansas, and more recently as manager of the company operations in Mississippi with headquarters at Natchez.

C. R. O'Dell

»

R. C. Schorlemmer has been named superintendent of The Texas Company's plant at Port Neches, Texas. He succeeds the late **Dr. Felton S. Dengler.**

»

Charles W. Shugert, assistant to the advertising manager of Shell Oil Company, was named president of the Industrial Advertising Association of New York.

PLAY
at Las Vegas, Nevada
These speckled beauties grow bigger at Lake Mead—a short scenic drive from the restful luxury of your room at the Last Frontier. Catch a big one—our chef will broil it to your taste. Then join the fun in the Gay Nineties Bar and Club "21" casino ...or dance to a name band in the Ramona Room. You'll have a grand time!
THE EARLY WEST IN MODERN SPLENDOR
Hotel LAST FRONTIER
LAS VEGAS NEVADA
Write for Colorful Folder

Deaths

E. L. (Bill) Berry, 52, vice president in charge of production for Link-Belt Company, died April 3. Berry began his Link-Belt career in 1914 and had advanced to the vice presidency of the organization on January 1, 1944. He was also a vice president and director of Link-Belt Speeder Corporation. During the war he was vice president and general manager of the subsidiary Link-Belt Ordnance Company.

»

Fred F. Nigh, 66, Houston independent operator, died April 15 after an illness of two months. He went to Houston from Shreveport, La., in 1925.

»

Elijah Paul Wilburn, 64, drilling contractor and resident of Houston 40 years, died April 15.

»

C. C. Warner, Rocky Mountain landman, died of a heart attack in Casper, Wyo., April 10. Warner recently retired as division landman with Stanolind Oil & Gas Company after 23 years of service.

»

W. G. Hiatt, 49, Bartlesville, Okla., vice president of Phillips Petroleum Company in charge of refining, died April 12 in Sarasota, Fla. A native of Pittsburgh, Hiatt moved to Bartlesville in 1919 and was associated with the U. S. Bureau of Mines prior to joining Phillips.

»

Don L. Sullivan, petroleum attache of the U. S. legation at Cairo, Egypt, was killed in a crash of a legation plane while en route to Addis Ababa to make a study for a report on the Ethiopian oil situation.

Century Geophysical Moves Into New Quarters

Century Geophysical Corporation moved into its new laboratory and office building at 1133 N. Utica Ave., Tulsa. The firm was established two years ago, incorporated in August, 1946, and combines two former companies, the Century Manufacturing & Instrument Company, and Continental Geophysical Company. The new building and its five-acre site represents an investment of approximately $250,000. The building is two stories in front and three in back and was designed for the addition of two wings of two stories each. One of these is now under construction. The firm employs about 100, more than half of whom work in the Tulsa plant. Opie Dimmick is president of the corporation; M. E. (Bob) Morrow is executive vice president; and E. J. Handley and C. E. Hendricks are vice presidents.

B. L. Hindman

R. Hortenstine, Jr.

Supervisory Personnel Promotions Announced by Continental Supply

The Continental Supply Company, Dallas, has announced the appointment of two additions to the organization's supervisory personnel.

B. L. Hindman has been named assistant district manager in charge of operations at Laurel, Brookhaven, Natchez and Jackson, Miss., and Jena, La. His headquarters are at Brookhaven.

Raleigh Hortenstine, Jr., is now assistant district manager for the area made up of Baton Rouge, New Orleans, Houma, New Iberia, Eunice and Lake Charles, La., with headquarters at New Iberia.

Branch Management Changes Made By International Harvester

After almost 25 years of service, M. A. Stanton, branch manager at International Harvester's Buffalo motor truck branch, has been retired.

W. G. Schendel, formerly assistant manager at Buffalo, has been promoted to branch manager to succeed Stanton.

G. D. Partridge, formerly assistant manager at Cleveland motor truck branch, has been promoted to branch manager at Baltimore motor truck branch, replacing B. M. Kaiser, recently appointed Southwest district manager.

Parkersburg Celebrates 50 Years Of Service to Oil Industry

Completion of 50 successful years in the oil field supply business is being observed by The Parkersburg Rig & Reel Company. In commemoration of this golden anniversary, the April issue of *The Rig & Reel*, company publication, has been designated the 50th Anniversary Issue and records highlights of the oil industry from its birth. The publication characterizes the oil industry by the men who made it grow and prosper under the ideals of "rugged individualists" that they were.

The issue presents the firm's top management, including the division and branch managers. A brief history of each division is indicative of its growth. The history of Parkersburg, contained in "An Outline of Fifty Years With the Oil Industry," relates how the company's founder, John Crawford, started a business on his faith in the oil industry and a few hundred dollars. The special issue concludes with brief descriptions of two colorful boom towns, Ranger and Burkburnett.

Tube Turns Moves Offices

The Chicago offices of Tube Turns, Inc., of Louisville, Ky., have been moved to suite 904 Fairbanks-Morse Building, 600 South Michigan Ave. The offices will be the headquarters for George C. Anderson, district manager of Tube Turns' Welding Fittings Division; Donald A. MacNeil, district manager of Tube Turns' Forging Divisions, and their staffs.

Reed Buys Tool Line

Reed Roller Bit Company, Houston, has purchased the pneumatic tool line of products from Cleveland Pneumatic Tool Company, Cleveland. Inventories of raw material, semifinished stock, finished stock and the machine tools will be moved to Houston, where Reed will manufacture its new products.

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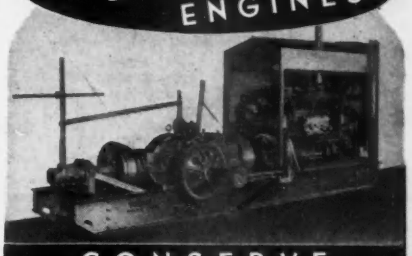

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TRADING POST Section
ON PAGE 86 OF THIS ISSUE

Personnel Changes Announced by Jarecki Manufacturing Company

W. Howard Pape, vice president in charge of Jarecki Manufacturing Company's supply division, announced the following personnel changes:

N. D. Marko has been promoted to district manager of the Panhandle Area with district offices at Borger, Texas. He was formerly store manager at the Borger store, where he will be replaced by Fred Niemeier, who has been field salesman. Marko's experience with Jarecki dates back to the early days of the Seminole boom and coincides with the industrial expansion of the Southwest.

J. D. Freeman, formerly store manager of the Russell (Kansas) store, has been promoted to district manager with district headquarters at Great Bend, Kansas. J. W. Stewart has been promoted from field salesman to store manager at Russell.

Hugh A. Brightwell and Jack Barnes have been added to the sales staff at Tulsa.

Independent Exploration Plans Fort Worth Office Expansion

John H. Wilson, vice president of Independent Exploration Company has announced plans for the expansion of the firm's Fort Worth office which serves North and West Texas and the Rocky Mountain states. Wilson will continue in charge of all operations in these areas.

John H. Wilson

George H. Harrington, Jr., specialist in gravity meter work, is moving to Fort Worth from Independent's Houston office to become assistant manager in charge of gravity survey work.

On March 31 Independent Exploration Company occupied new and larger quarters in the Electric Building, Fort Worth.

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